

NEW QUICKEN • 100MHz PENTIUMS • DIGITAL GADGETS

PC Computing

APRIL 1995

Psst... Want to know the real story?

Windows 95 Unveiled



Skip all the hype!

Stop the Microsoft bashing!

What's really **going on?**

Our exclusive inside report

uncovers the whole truth.

THERE
IS A PACK OF GIANT
FIRE BELCHING
MONSTERS

WAITING FOR YOU.

THEY CRUSH BOULDERS

AND SMASH

HUGE TREES.

WHAT DO YOU WITH YOU? IF YOU'RE F. MICHAEL

WILCOX, YOU TAKE

Microsoft Office®. Almost everywhere. You see, as a Specialist for G.E.'s Apparatus Service Department, Mr. Wilcox wrestles with giant machines every day: electric motors, compressors, gear boxes. The kind of machines they use at big mining operations and pulp mills. Machines the size of small buildings.

One of these babies goes down and a company can be looking at a serious productivity loss. Sometimes to the tune of \$40,000 an hour. So they look to Mike to prevent that from happening. And Mike looks to Microsoft Office.

Oh, he's tried other solutions. He's even tried a proprietary computer system which, unfortunately, wasn't compatible with the systems G.E.'s customers were using. Microsoft Office, on the other hand, is it's also more flexible and, frankly, more capable. In fact, during the first year of rollout, Mike and Microsoft Office managed to save one customer a whopping \$375,000. (Imagine putting that on your résumé.)

The reason Mike can work miracles (and you can too) is because everything in Microsoft Office works together seamlessly. First there's Microsoft Access, the database application where every piece of information on every piece of equipment G.E. monitors is stored.

Let's say Mike wants to do a graphical trend analysis, and maybe a little bit of charting to figure

out when a gasket is likely to blow. First off he hits the "Analyze It" button, which automatically turns his database table into a Microsoft Excel spreadsheet. Then he and the built-in Wizard whip up a chart.

Our next stop on the assembly line: Microsoft Word. Here Mike uses a template to draft a report warning his client about that problem gasket. If it's real serious he shoots everything over to Microsoft PowerPoint®, includes a few thermographic photos, then blazes over to the site and presents his findings right there in the van.

As a result, the machine doesn't blow a gasket. The client doesn't blow a gasket. And Mike gets to ride heroically off into the sunset.

For more on how Microsoft Office can help you take on the monsters you face, just call us at (800) 240-4782, Dept. EME. We will be glad to send you a catalog that'll help put things in perspective.



Microsoft

WHERE DO YOU WANT TO GO TODAY?™

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TAKE





A full-page photograph of Phil Jackson, a man with a mustache, wearing a dark suit, white shirt, and patterned tie. He is sitting on a red basketball bench, smiling at the camera. He is holding a basketball in his right hand. In the background, a basketball hoop and backboard are visible. The text is overlaid on the image in a bold, white, sans-serif font.

PHIL JACKSON

HAS BEEN WARPED

SINCE THE START

OF THE SEASON.



Before any
basketball coach tries
to emulate the
winning ways of

Coach Phil Jackson, they

may want to take a peek inside his computer.

If they did, they'd see that Phil can do
some pretty neat things. Like use his computer

to review video

of last night's

game against

**THE WORD "TECHNICAL"
DOESN'T FAZE HIM.**

New York. At the exact same time that he's

e-mailing a respectful appeal to the League.

Of course, being a game day, he's also, at

the same time, using a Windows™ graphics

program to jot down plays.

They might also note that Phil never has
to worry about totally losing it (his programs,
that is) if an application ever goes down. And

that Phil can get on the Internet and other
on-line services incredibly fast and easy,
so he can get up-to-the-minute stats and
injury reports.

In short, they'd see that Phil has OS/2
Warp, a new multitasking operating system
that gives DOS and Windows* programs
amazing versatility. (And anyone who's ever

seen Phil coach,

knows he likes

versatility.)

Now, just so there's no confusion,

Phil's not letting anyone take a peek inside
his computer.

OS/2 Warp is available for under \$90.

(Or for just slightly more than the cost of a
court-side seat.) To get warped, stop by your
local software dealer, or call 1 800 3 IBM-OS2.
Ask for a free demo disk.

The new 32-bit, multitasking, multimedia, Internet-accessed, crash-protected,
Windows-friendly, totally cool way to run your computer. **OS/2* WARP**

IBM

OS/2 Warp is available from your software dealer. It is also available from IBM for \$89 by calling 1 800 3 IBM-OS2.

Reseller prices may vary. OS/2 Warp consists of OS/2 Version 3 and BonusPak. IBM, Operating System/2 and OS/2 are registered trademarks of the International Business Machines Corporation. The OS/2 logo is a trademark of IBM. Windows is a trademark of Microsoft Corporation. *On systems with Windows installed. © 1994 IBM Corp.

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At a mere 4.2 lbs., the Contura Aero makes the perfect traveling companion. Though lightweight, it's packed with features you'd never expect in a PC this small, including a 486 processor, a PCMCIA Type II slot, and an integrated trackball.

Aero Features:

Only 4.2 lbs. and 10.25" x 7.5" x 1.7"

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4MB RAM (expandable to 12MB)

170MB Hard Drive

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7.8" Color Backlit STN VGA Display

Integrated Compaq EasyPoint™ Trackball

PCMCIA Type II Slot

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Preinstalled MS-DOS® 6,
MS-Windows® 3.1, & TabWorks®



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per month*

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350MB Hard Drive

Two PCMCIA Type II Slots (or one Type III)

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(Color TFT available)

Integrated Trackball

Only 5.9 lbs.

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MS-Windows 3.1, TabWorks,
& Lotus Organizer



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» New «

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ProLinea Features:

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(other models available)

16MB RAM (expandable to 192MB)

720MB Hard Drive

256KB Cache

PCI Local Bus Graphics

PCI Local Bus IDE Interface

Compaq SVGA Color Monitor
1024 x 768

5 Drive Bays, 5 Slots

Preinstalled MS-DOS 6,
MS-Windows 3.1, & TabWorks

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Power like this usually costs more. Not this time. Loaded with features like a 486 processor, a 420MB hard drive, and pre-installed software, this model merges power with practicality.

ProLinea Features:

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(other models available)
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- 420MB Hard Drive
- 256KB Cache Optional
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- PCI Local Bus IDE Interface
- Compaq SVGA Color Monitor
1024 x 768
- 3 Drive Bays, 3 Slots
- Preinstalled MS-DOS 6,
MS-Windows 3.1, & TabWorks



Compaq ProLinea

ProLinea Features:

- Intel Pentium 75MHz Processor
(other models available)
- 8MB RAM (expandable to 192MB)
- 420MB Hard Drive
- 256KB Cache
- PCI Local Bus Graphics
- PCI Local Bus IDE Interface
- Compaq SVGA Color Monitor
1024 x 768
- 4 Drive Bays, 4 Slots
- Preinstalled MS-DOS 6,
MS-Windows 3.1, & TabWorks

» New «

Our popu-

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Or \$79 per month*

lar ProLinea series is better than ever. The essentials include 8MB RAM expandable to 192MB, a complete range of processors and fast PCI video. Plus, you'll get full Plug and Play capability and an easily upgradable design. So instead of just talking about improving, we did something about it—giving you more value for your dollar.

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Windows 95 Unveiled

Baffled by the myths, questions, and half-truths floating around about Windows 95? Is DOS really dead? What's the scoop on 32 bits? Can OS/2 be

redesigned to run Windows 95 applications? And when will it finally emerge out of vaporware? The *PC Computing* polygraph puts the top ten lies to the test to give you the inside story. **154**

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MINDFOOD

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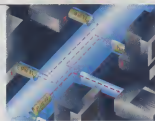
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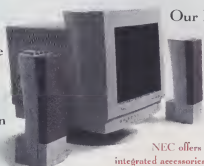
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Three years ago, we embarked on a mission. To build a monitor that was so clear, so brilliant, so easy to control it would make your work more enjoyable.

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AND FEEL THE
DIFFERENCE.™**

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*When used with Plug and Play compatible hardware and Microsoft Windows™ 4.X.

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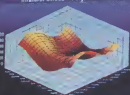
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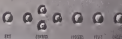
Laboratory scientists at SYNTHETEX have developed what they believe is the world's strongest fiber. The fiber gets its strength from a process that restructures polyethylene fibers. This process makes fibers 100 times lighter than conventional fibers.

Stress - Strain - Polymer Reaction



1.000	0.452
1.502	0.517
2.000	0.097
2.507	0.065
3.252	1.544
3.788	1.782
4.013	1.979
4.507	2.056
5.780	2.370
6.905	3.012

NEC



THE NEW NEC VERSA P WITH JUST WHAT YOU'VE WAITED FOR. A NOTE

**Now
Shipping**

Now you can slice through those mega spreadsheets, speed through your compute-intensive CAD/CAM applications and create truly professional, full-motion, multimedia presentations, thanks to the new NEC Versa™ P. With its 75MHz Pentium™ processor, the Versa P is more than 100% faster than the equivalent Intel 486™ system. And we've fine-tuned the performance with 256K of secondary cache. So it has the horsepower to race through programs that used to crawl on anything but a desktop system.

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VersaVision™ High-Resolution 800 x 600 TFT color screen*,

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with our free courier service.

So what are you waiting for? Find out more about the

- 75MHz Intel Pentium processor, 256K secondary cache
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AND FEEL THE
DIFFERENCE.™**

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PENTIUM PROCESSOR POWER.
BOOK YOU DON'T HAVE TO WAIT FOR.

The laptop screen displays a business presentation with the following content:

- Top Left:** A small portrait of a man in a suit.
- Top Right:** A table with columns for 'TOTAL GROWTH' and 'TOTAL REACH'.
- Center:** Two line graphs. The left graph is titled 'TOTAL GROWTH' and the right graph is titled 'TOTAL REACH'. Both graphs show data points over time.
- Bottom:** A table titled 'ANNUAL MARKETING RESULTS' with columns for 'Year', 'Sales', 'Profit', 'Market Share', and 'Customer Satisfaction'.

The laptop is an NEC model, with the brand name visible on the bezel below the screen.

Energy Star
EPA POLLUTION PREVENTER

intel inside
pentium

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systems are pretty
much the same.
(and pigs can fly)

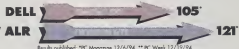
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genuine Intel
microprocessors in
our quality
computer systems.



The ALR EVOLUTION X/75

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Winstone 95
Higher Score is Better
Winstone 95 Ver. 1.0 was used to measure
the machines' performance when
running typical Windows applications.



The secret to this added performance is our award-winning, 64-bit Flex architecture enhanced with 256-KB of write-back cache. Thanks to this design, the cool running 75-MHz Pentium processor can soar to new heights of performance.

ALR... FIRST TO ENGINEER
QUAD 100-MHz PENTIUM
SYMMETRICAL MULTIPROCESSING
WORKSTATIONS & SERVERS.



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 • 75- and 90-MHz Pentium Processor enhanced with PCI Local Bus Technology
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 • PCI Plug 'n' Play Technology
 • Three 3.5" and three 3.5" Storage Bays
 • 200 Watt Power Supply
Prices Start at \$1595 & \$1995 (msrp) for 75- and 90-MHz Pentium Processors, respectively.

ALR
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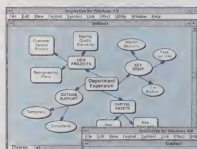
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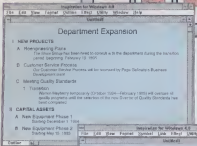
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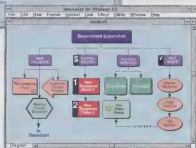
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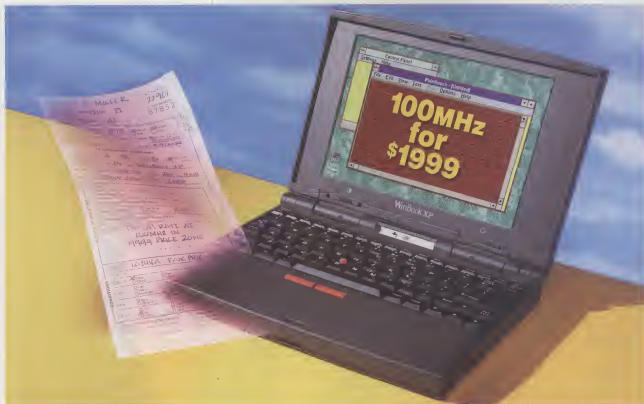
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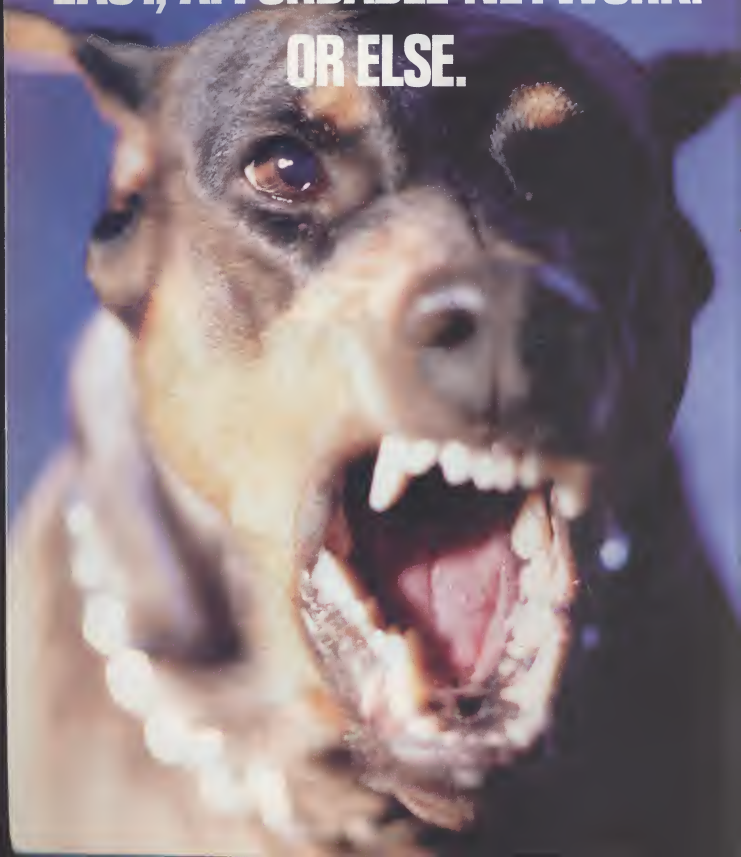
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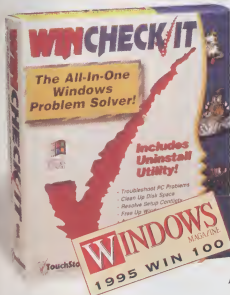
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A
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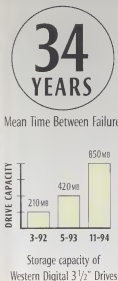
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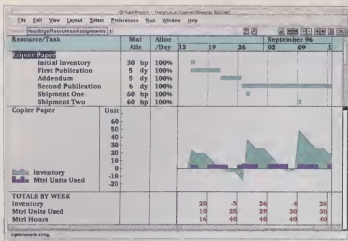
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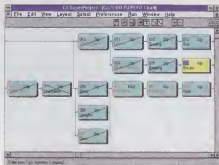


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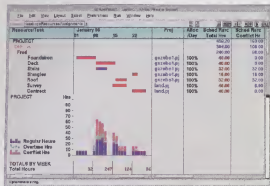
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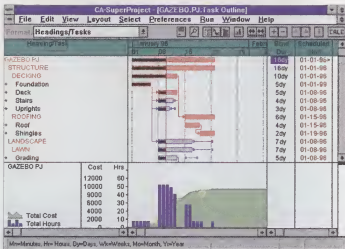


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ON THE LINE OF FIRE

Throw Newbies Off the Net?

America Online subscribers have a reputation for asking stupid questions and posting in inappropriate newsgroups with complete disregard for netiquette. In its quest for new subscribers, America Online has unleashed thousands of inexperienced users onto the Net. This does both the users and America Online a disservice. Users are lost when they arrive and inherit the stereotype of being "dumb AOL-ers." America Online's reputation is hurt as newbies complain about getting flamed. The service should provide some guidelines to new Net users. Remember, America Online—the Net was there before you were, and you are profiting from it.

KEITH LEVKOFF
KLEVKOFF@PANIX.COM

Turn a Profit on the Web

As a small-business owner, I was intrigued by the positive Internet marketing experience of the Thanksgiving Coffee Company in the January issue ("The Real Web Buzz," page 306). I'd like to hear about the experiences of other businesses that have used World Wide Web services like CommerceNet and NetAccess. In fact, it would be great to see a more in-depth article that compares and contrasts the opportunities and challenges of companies that try to do business on the Internet.

ALEX BAILEY
ALEXBAILEY@AOL.COM

STAY TUNED. Check out our March feature "Find It & Do It Online" (page 112). Also look for an upcoming article about our favorite Internet sites. And of course, check our I-Way Patrol section (page 281) and our Web page for the latest ways to leverage the Net. WT

Find a Home for Orphanware

I enjoyed (as always) John C. Dvorak's January column about putting orphanware into the public domain ("Free the

Code," page 75). The excuse most vendors give for not doing this is that some of the code is reused among other products that are still in production. But hey, after a few years, the rapid changes in software engineering make this argument moot.

PHIL GLATZ
PGLAT@SIERRA.NET

Stop the Tyranny

In the January issue, Dvorak implores the major software vendors to release older apps into the public domain. What a great idea! Windows is the sloppiest, slowest, most unreliable product I've ever used. If DOS and its applications were released into the public domain, we'd all have an inexpensive, easy alternative to the slew of Microsoft products.

JON FREDERICK
JON_FREDERICK@MOAMX.COM

The Right Fork in the Road

I was delighted to find your article "PCs at the Crossroads" (January, page 166), which addresses all of the different standards and the hardware confusion that we all confront. I now have at my disposal a one-stop guide to all the pros, cons, and

recommendations for microprocessors, buses, and communications devices.

CHRIS WOLFERTZ
CHRIS.WOLFERTZ@OWL.UU.EDU.NET

OUR FIRST CROSSROADS feature garnered favorable reviews from our readers. Everyone here liked it too, so we made it a regular feature of the Help section. See page 170 for this month's Crossroads, which discusses the pros and cons of Ethernet vs. Token Ring networks. JOC

Securing Faith

As someone who helps support several thousand workstations at a large corporate site, I appreciated your recent Help article, "Lock, Stock, and Password," on protecting sensitive or confidential data (Working Smarter, January, page 202). Introducing security on a system where it is not warranted raises administrative costs without providing any benefit. If you suspect your data is inadequately protected, try relocating it to a more secure machine. And try to avoid situations in which passwords are stored only between the ears of a single individual. When using a "traveling" floppy disk to protect data, be sure to have a backup copy and run both a virus scan and a diagnostic utility (such as Norton Disk Doctor or MS-DOS 6.22 ScanDisk) on these disks regularly.

IRA D. WORDEN
IRADW@AOL.COM

WISE ADVICE. But sometimes security is strictly a psychological measure that makes you feel better. After all, I'm not really paranoid . . . that's just a rumor my enemies are spreading about me. EB

Fame by Flame

I like the new, improved way you respond to letters from readers. Too many magazines remain silent or, worse, grovel when a reader takes issue with an article. Keep up the snap. I particularly

liked Paul Somerson's response to reader Paul Gettys in the February issue ("It's a Paul Thing," page 33). Somerson precisely captured my reaction to those letters that show up in *every* issue. But Mr. Gettys (and other late adopters) should not be overly concerned. Despite the logic and inevitability of Mr. Somerson's suggestion, software simply will not be distributed exclusively on CD-ROM until software distributors are convinced that they are not cutting themselves out of a significant market.

HAL DAVIS
HALDAVIS@AOL.COM

Shortsighted or Shortchanged?

I was dismayed by Paul Somerson's insulting response to a letter from Paul Gettys. Mr. Gettys was expressing a common lament of small business—namely a lack of funds to buy the latest and greatest equipment. People in his position are understandably turned off by folks who think that you must always buy the newest and best products out there. Just because Mr. Gettys can't afford something doesn't make him shortsighted.

WILLIAM K. RALPH
WCRALPH@INDY.NET

CD-ROM-a-Rama

It's about time somebody like Paul Somerson started promoting CD-ROM drives ("Dear Santa," November 1994, page 41). I've been recommending CD-ROM drives to everyone for years. I used to tell myself I couldn't afford one, but everyone I know who bought a machine without a CD-ROM drive (against my advice) has now bought a drive separately. For Mr. Gettys' information, it doesn't take a 486DX—anything to run a CD-ROM drive. In fact, slower machines appear to use them more efficiently than fast, fancy machines. Every machine needs a CD-ROM drive.

GEORGIA E. GATES
CIS: 71163, 2204

Gettys' Address

In February Mail, you printed a letter I wrote. I stated that I was tired of reading complaints about technology I couldn't afford. Apparently, my writing lacked clarity, because Mr. Somerson mistook fiscal responsibility for shortsightedness.

To some extent I agree. Given the size and complexity of applications, distribution by floppy disk is costly, and installing these can be time-consuming and frustrating. The industry is moving toward the day when CD-ROM drives will be standard on all new PCs. But the reality is this: Many of us just don't have the money to keep buying the best hardware all the time.

Your readers look to you to get the most from what they *can* afford. It doesn't help to read complaints about how poor the current state of the art is, when we often have to settle for less than what you're complaining about.

PAUL E. GETTYS, III
PGETTYS@LMI.ORG

GET REAL. CD-ROMs are standard on most systems sold today. You can buy a top-quality dual-speed CD-ROM drive for just over \$100. That's a small price to pay for the vast benefits that CDs offer. Shortsightedness is as shortsightedness does. **PS**

Who's the Expert?

Ed Bott obviously hasn't unlearned everything he learned from Windows 3.x (based on his February column, "The Unlearning Curve," on page 338). Copying and moving files in Windows 95 is easier than ever before. Instead of opening Explorer, you can use My Computer, which is almost the same as Explorer, except it opens another window for each directory. I suggest that Mr. Bott learn about what he is writing about so that he doesn't misinform the public about what Microsoft Windows 95 can and can't do. The truth is that Windows 95 does everything Windows 3.x did and more, and it does so faster and easier!

LARRY T. BUDD
LUDINGTON, MICHIGAN

DIFFERENT STROKES for different folks. Yes, the Windows 95 cut, copy, and paste strategy is a big plus, but Microsoft has positioned the Explorer as the expert's replacement for File Manager, and My Computer as the interface for less sophisticated users. I've been using Windows 95 full time in a production environment on four machines since last summer. I know Explorer. And Explorer is definitely not as capable as File Manager. **EB**

The Ultimate Bait and Switch?

I was excited about your review of Zeos's Pantera 90 in "The Ultimate PC" (February, page 148). So I went to a local store. Delighted to note that it fit within my budget, I called Zeos. When I placed the order, I was told I could not purchase the PC described in your review for the price listed. As a matter of fact, I would have to pay many hundreds of dollars more to acquire that machine. Is this what is meant by the term "bait and switch"?

RICHARD J. DALZEL
DALZEL@TARDIS.SVSU.EDU

\$1,000 HERE, \$1,000 there—pretty soon you're talking about real money. Unfortunately, the \$2,000 price tag was just wishful thinking: We printed the price for a base configuration, rather than the system as tested. Oops. **JM**

We'll Double-Take It


Hey, what's the deal? The December 1994 issue says Gateway 2000's P5-90XL is an MVP finalist and an "awesome multimedia machine at a bargain price" ("The Editors' Choice," page 126). Your February issue ("The Ultimate PC," page 148) says the same machine is "marred by poor performance" and "too many things aren't right." What's the story?

BLAKE EITNIEAR
EAST CHINA, MICHIGAN

"FOOLISH CONSISTENCY is the hobgoblin of little minds," said Ralph Waldo Emerson. It's amazing how quickly our industry changes: When we first looked at Gateway 2000's P5-90XL, it was the hottest thing we had seen. Then everybody else came out with 90MHz and 100MHz systems and Gateway was eclipsed. But stay tuned. **JM**

Can We Interact?

I think *PC Computing's* new CD-ROM is well-done and informative. But I have a problem with the interactive columns. In John C. Dvorak's column, if you don't agree with him early on, then he's "out of here." Rather than end the conversation, why not throw in a few more clips telling us

A photograph of a computer monitor sitting on a dark desk. The monitor's screen is black, and the text 'Say goodbye to working in an isolation chamber.' is displayed in a red, serif font. The background is a light, neutral color.

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Shareware Your Thoughts

The "80s Throwbacks: Peter, Paul, and XTree" (October 1994, page 210) meant a lot to me. The scope seemed to really address where I am with DOS utilities. I appreciated the words, "If you're just beginning to amass a collection of shareware tools." I hope Yael Li-Ron (man or woman?) continues to write these articles. Maybe you can make it a series.

PAT O'MAHONY
DALLAS, TEXAS

GLAD YOU FOUND Ms. Li-Ron's writing on target. You'll probably also like Mr. Rich Schwerin's I-Way, which features all kinds of shareware goodies for business and for fun. **JOC**

The Net Is Safe for Democracy

I disagree with Jeremy Nimmer's comments in the January Mail ("This E-mail Is Officially OK," page 25) regarding censorship on the Net. He advocates requiring

all access sites to provide a way to block parts of the Net, and agrees with the idea of prohibiting e-mail from users who are not on a personal "OK" list.

Requiring access sites to provide *anything* is silly. You can't censor what someone sees on the Net. But you can censor a newsgroup. If you force each site to be personally OK'd by a teacher, parent, or other person, you destroy the Net's usefulness. It isn't the government's problem, my problem, or the access provider's problem. If you don't want to read something, don't read it.

Don't tell me what I should provide, or what I should have to censor. The government already does enough of that with the raids of BBSs. The day action is taken to censor the Net will be a dark day indeed.

JASON BURRELL
JBURRELL@CRL.COM

For the Record

• In the February Help guide to communications and data sharing ("Videoconfer-

encing Is Virtual Face-to-Face," page 242), Creative Labs' Sharevision PC3000 exchanges data as well as voice and video.

• In the January Direct to You section ("Ethernet Cards: A Plumber's Helper," page 229), 10Base2 should be identified as Thin Ethernet and 10Base5 as Thick Ethernet.

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PC Computing

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Publish/Present/Get Wired You have a message to convey to many people at once. What are the best ways to bring it to life? We look at complete solutions for desktop publishing, presentations, and creating a home page on the World Wide Web.

101 SITES TO SEE The Internet is rich with useful information just waiting to be discovered. You can use the Net to do more than just playing around: follow your stocks, pick up management techniques, catch up on the music scene, and much more. There are thousands of online sites out there. How can you find them all? We do the work for you and point out the best sites for finance, industry information, and trends.

UPGRADES THAT PAY In the face of ever-changing technology it's your job to get the most for your company's money. We look at fax, modem, and scanning/OCR upgrades that get the job done faster, more easily, and with less frustration.

TELEPHONY CALLING Tired of checking your voice mail? Sick of answering every call that comes through? Then you need computer-based telephony and you need it bad. We give five business scenarios and show you how this technology can provide big-time benefits and actually increase productivity.

ALSO NEXT MONTH

Crossroads Which CPU will win the great Processor War: Pentium or PowerPC?

Working Smarter Need to install and configure a LAN? Follow our step-by-step instructions and you'll be up and running in no time.

Spec Watch Sure, ink jet printers are affordable, but do you know how good they've become? We tell you which features to look for when shopping for a color or black-and-white ink jet printer.

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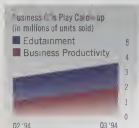
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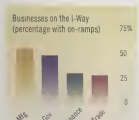
SOURCE: SOFTWARE PUBLISHERS ASSOCIATION

What's Spinning: Sales of edutainment CD-ROMs grew by 39 percent in one quarter last year, but sales of business titles grew more quickly—67 percent.



SOURCE: ELECTRONICS INDUSTRIES ASSOCIATION

Info Appliances: Sales of home PCs passed those of standard color TVs for the first time ever last year. But the TV is still America's favorite entertainment appliance.



SOURCE: BUSINESS RESEARCH GROUP

Net Use: Which business sectors use the Internet more than others? A sample of 350 medium-to large-sized companies found that manufacturing leads the stampede.

TELEPHONY

Universal Mailbox

Every morning, I get up, put on the coffee, then spend an hour or more firing up CompuServe, America Online, MCI Mail, Lotus Notes, and Schedule + one after another. While one computer is tied up digesting my morning helping of e-mail, appointments, and preselected news items, another is needed to take down voice mail and print faxes, including a daily news fax. Sound familiar?

Imagine not having messages and info scattered across the subdirectories of a half-dozen separate applications. And wouldn't it be great to get into all those documents with a single text editor and manage them—even voice mail—with a single file manager? Ever dream of intelligent agents for doing your electronic gophering, then screening and sorting this info heap?

Microsoft is spinning the same fantasy, as are its major groupware competitors, Lotus and Novell. All are reshaping their network offerings into



One-stop In-box: Soon you'll be able to retrieve your phone, fax, voice-mail, and e-mail messages from a single in-box.

universal in-boxes. Among the many products that will ride in on the Windows 95 bandwagon is Microsoft Exchange, a single in-box that appears as an icon on the desktop.

Naturally, the entire vision won't be delivered at the time of Windows 95's debut. But Exchange will let you send and receive e-mail, voice mail, faxes, and pages from the comfort of its rich-text editor. The look is closer to Microsoft Word than Windows 95's WordPad, with full formatting capabilities and

OLE linking and embedding. You can attach spreadsheets, WAV files, or AVI video clips, and send, receive, or broadcast faxes. You can also send and receive schedule requests. And everything will be a desktop object, so even voice mail can be dragged and dropped with Explorer, Windows 95's answer to File Manager.

In the first go-round, the Exchange Client will connect with Microsoft Mail, CompuServe, and Internet mail services via Microsoft-built drivers, and

UPDATES

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Reader Service No. 603

Next-Generation Color Printers

it will connect with other popular e-mail systems via their gateways. Microsoft is relying on third parties such as Otel Communications to provide paging and voice-mail solutions. Exchange will replicate everything across all servers, thereby making your in-box a one-stop QuickieMart for electronic information.

Novell, meanwhile, is closing in on a similar project for its groupware product, GroupWise, which should ship as early as this summer. **MH**

Two-Sided CDs A big year for CD-ROMs? You could call 9.6 million titles in 1994 a big year. Now they're going Hollywood. Sony and Philips have teamed up to create a 7.46GB CD-ROM standard. That's about 11 times the storage capacity of current discs and enough to hold a full-length movie or a very long computer-based video. Toshiba and Pioneer have put forward a competing double-sided standard. Examples of either may not be out until the second half of the year, but rest assured, movies are coming to a small screen near you. **MH**

Single-Pass Color Just when you thought color lasers were as good as color gets, Tektronix has changed the rules. Improving on solid-ink technology, the Phaser 340 has a larger print head than previous solid-ink printers and can place the image on the page in a single pass instead of line by line as most printers do. The payoff? Fast, high-quality output with a lower cost per page than color lasers. Check out "Stun Them with a Color Phaser" on page 60 for our review of the first continuous-tone color laser. **KC**

Critical Mass

The third time's a charm, as far as Apple is concerned. The **Newton MessagePad 120** features better communications options, a **clearer screen**, and enough voltage to run high-power peripherals. It all adds up to a **PDA with legs**—finally. The key to usability, though, is the availability of **1,000 apps** such as **Pocket Quicken** and **ACT!** for Newton. **RS**

Newton MessagePad 120 / Apple Computer / (800) 365-3690, (408) 996-1010 / \$599 est. street price / Reader Service No. 604

A Gig to Spare

What's a gig cost these days? Under \$500 if you know where to look. Here are the least expensive 1GB or larger Enhanced IDE hard drives we could find as of January 25, 1995.

Product	Price/Size
Western Digital Caviar 31000 Aberdeen (800) 552-6868	\$431/1GB
Seagate 31220A HITDS (800) 252-9777	\$469/1GB
Conner CFA1275A PC Importers (800) 886-5155	\$499/1.27GB
Conner CFA1275A CMO (800) 233-8950	\$529/1.27GB

Reader Service Numbers:
Aberdeen 605; HDSS 606;
PC Importers 607; CMO 608

RADAR

GIF BITES THE DUST, NETWORKS COME HOME

Maps in Apps First spreadsheets that map your data; now satellite e-mail that hunts you down. You can run, but you can't hide.

The CD-Everything Disc It's a PC CD! It's a Mac CD! It's an audio CD! It's all of the above. Now explain where to shelve it.

GIF Nothing dies faster than a proprietary file format. Even GIF's owner is using JPEG.

Home Nets Kids play better together in separate rooms, and e-mail beats talking to your teenagers.

Sensible Names DDS, Windows, and even OS/2 make sense. Bob? Warp? Puhleeze.

Gratuitous Browsers instant \$99 software upgrade: Just add a Web browser.

What's on the Scope? If a blip is near or moving toward the middle of the radar screen, check it out. If it's moving off the screen, steer clear for now.



Kick Your 486 Into Overdrive

If you've been eyeing your 486's overdrive socket as a hedge against obsolescence, its time has arrived. Well, sort of. Intel's long-delayed 486-to-Pentium OverDrive chip, previously dubbed the P24T, promises to bring 63MHz Pentium processing might to most 50MHz SX2 and DX2 systems, as well as 25MHz 486-based systems. Your mileage, however, may vary.

Installing the OverDrive chip is a snap: Intel supplies a software demo that walks you through the process. Based on the company's low-power, 3.3-volt design, the OverDrive includes its own voltage regulator and a fan to stay cool.

Performance gains on a 25MHz 486 ranged from 57 to 115 percent. The boost for a 50MHz 486 was less dramatic: It ranged from 13 to 53 percent. If that sounds good, consider the OverDrive's \$449 price tag—a substantial down payment on a full-fledged Pentium. Also, it falls short of what you'll see with a true Pentium. Our 60MHz model was 32 percent faster in application tests.

Intel plans to release an OverDrive chip for 33MHz and 66MHz 486s in June. Also in the works: a 120MHz OverDrive chip for 60MHz and 66MHz Pentiums. **WT**

OverDrive / Intel / (800) 538-3373 / \$449 est. street price / Reader Service No. 609

Prodigious Makeover

Prodigy, the IBM/Sears online collaboration often maligned for its less-than-attractive user interface, has finally cleaned up its act. **Prodigy's face-lift**, code-named P2, retains all current Prodigy features—**news, weather, sports, and financial information**—under a Windows interface. The **advertising** is still there, but Prodigy has tried to make it less intrusive. Even better, **unlimited Web access** is part of the monthly service charge of only \$9.95. **RS**

Prodigy / Prodigy Services / (800) 776-3449 / \$9.95 per month / Reader Service No. 610



MICROSOFT NETWORK

A 'Civilized' Alternative to the Net

To get anywhere in this world, you need the right connections. That fact is obviously not lost on Microsoft, which earlier this year announced plans to turn the Microsoft Network (MSN) into the world's largest port of entry for the Internet.

If you thought the MSN was strictly a CompuServe killer, think again. Bill Gates has bigger plans for the online service that will be integrated into Windows 95. Microsoft has contracted with Internet service provider UUNET Technologies to build a worldwide dial-up network that will be hooked into UUNET's TCP/IP backbone. MSN subscribers who choose to establish a point-to-

point protocol (PPP) connection will be able to explore the Internet or access the MSN's more structured offerings. And while callers who dial in to the existing AT&T/Sprint X.25 network won't have to deal with TCP/IP setup, they will be limited to MSN's content.

When Microsoft's dial-up network is fully built, it should offer an online something for nearly everyone. Performance-sensitive Net surfers will be attracted to its high-speed connections: Anthony Bay, the MSN's Director of Internet and Corporate Services, predicts that by the end of 1995 "a huge percentage of the United States and a smaller percentage

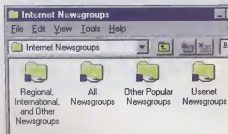
of the rest of the world" will have MSN access via 28.8Kbps and ISDN lines.

The squeamish and the cautious are also expected to stick with the MSN, which Bill Gates calls the "civilized" alternative to the Net. Its organized content, with selected links to the Internet and a systemwide ratings system, will make it easier for parents to lock kids out the Net's seamier neighborhoods.

Early beta versions of Windows 95 included crude text-based Internet tools. Expect that to change by the end of this year or early next year. Microsoft has licensed the source code for NCSA Mosaic, the ubiquitous World Wide Web browser. Ultimately, a 32-bit version of Mosaic, tuned for use with the MSN, will be available to any Windows 95 user.

Will these developments appear in time for the commercial release of Windows 95? No way. Still, Microsoft promises that the Microsoft Network will be live when Windows 95 is released and that the UUNET connections will be widely available by year's end. Issues of packaging and pricing, meanwhile, are still up in the air. **EB**

Contributors to Pulse: ED BOTT, KYLA K. CARLSON, JAMES OLIVER CURY, MIKE HOGAN, MATTHEW LAKE, RICH SCHWERN. Edited by WENDY TAYLOR



Keep the Riffraff Out: The thoughtfully organized content on the Microsoft Network will make it easier for parents to lock out the Net's seamier neighborhoods.



In the fast and furious 90's, work just got easier.

Easier for you.

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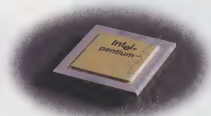


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TASK MASTERS

Here's some welcome news: The Application, as we know it, is finally dead. OK, maybe it's teetering on life support, sucking up some **LAST-GASP GOBS** of Medicare on its way out. What did it in? Spiraling overcomplexity and featuritis started it on its slide. Take-no-prisoners suite-crazed marketing accelerated the process. And the first real glimmerings of OLE 2.0 integration sealed its fate. But what drove the stake through its heart was an elegant usability breakthrough from the Novell (née WordPerfect) folks called QuickTasks.

For years we've been **LYING TO EACH OTHER**. We've been saying we want powerful PC tools. Wrong. What we really want is to Get the Job Done. People lie like this all the time. For example, they'll tell you someday they want to build a dream house. But the last thing in the world they actually want is to do is schlep a bunch of power tools around. The truth is that they want an expert like an architect or contractor to ask them some questions and then build it for them. Same with PC tasks.

Microsoft figured this out years ago when it snuck a few "wizards" into its Publisher program, and later moved these into its other apps—oops, there's that word again. But it treated these as **BIT PLAYERS**, shortcuts inside specific programs. You first had to open a spreadsheet or word processor and then figure out how to wake up the appropriate wizard.

Novell lets you do this too. But it also moved triggers for its wizards (which it calls "coaches") **OUTSIDE THE PROGRAMS**. Novell's PerfectOffice 3.0 comes with a suite manager called DAD that looks like Microsoft's MOM suite manager on steroids. In addition to

launching suite components and performing common PC chores, the far more powerful DAD lets you quickly open any recently used file, run any command, use the slick file manager, hop into DOS, or best—take advantage of its muscular QuickTask menu.

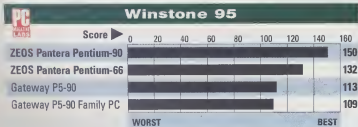
Want to create an instant cash flow statement, balance sheet, fax, agenda, calendar, budget, slide show, invoice, expense report, press release, purchase order, resumé, brochure, greeting card, or Gantt-chart project manager? Or do network management, or check your mail, or dispatch **MORE THAN 60 COMMON TASKS**? Zap! One click on the cross-application menu and QuickTask launches the right software, loads the right templates, walks you through the process, shuffles data from one place to another as needed, gives you a chance to customize the results, and you're done. No fuss, no muss, no apps.

Now some of us still like to tinker in the basement or under the hood or onscreen. If you're a toolhead, DAD politely gets out of the way. But if you're a typical overworked businessperson who hates manuals and tutorials, and just wants to get lots of jobs done as efficiently as possible, ask DAD for some task-oriented help. And **KISS YOUR APPS GOOD-BYE**.

One Slow Cow VS. One Fast Cat.



While they're grazing, ZEOS is blazing... and setting new records. In a December 6, 1994 comparison report, *PC Magazine* benchmarked 96 Pentium processor-based systems. The ZEOS Pantera Pentium-90 earned the highest Winstone 95 score of *all* machines tested, and the Pantera Pentium-66 easily passed both of Gateway's Pentium-90 PCs! If you're after performance (and who isn't?), then get a Pentium processor-based system. But, as the benchmarks prove, not all Pentium PCs deliver. The ZEOS Pantera will give you unbeatable performance and the highest quality features—all at an affordable price. And it's ready to ship *today!* For the fastest, hottest Pentium-based PC, call a ZEOS Systems Consultant now at 800-554-5218.



Reprinted from PC Magazine, December 6, 1994

Pantera As Tested:

Pentium-66 \$2745
Pentium-90 \$3095



- > Genuine Intel® Pentium™ 66 and 90 processors
- > 16MB RAM, 256K SRAM cache
- > 1GB local bus IDE hard drive, 256K cache
- > 4X CD-ROM drive and 3.5" 1.44MB floppy drive
- > Diamond Stealth 64-bit PCI local bus SVGA color graphics card with 2MB VRAM upgrade
- > 15" 1024 x 768 NI SVGA color monitor, 28mm dot pitch
- > Two high-speed serial ports, one enhanced parallel port
- > On-board Fast SCSI-2 option (Pentium-66)
- > On-board PCI local bus Fast SCSI-2 and Ethernet options (Pentium-90)
- > Six-bay desktop case (Pentium-66)
- > Ten-bay vertical case (Pentium-90)
- > 101-key space-saving keyboard
- > Microsoft Mouse
- > Microsoft DOS 6.2 and Windows for Workgroups 3.11
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AN AFD API



I've always been fascinated by the research labs of IBM, Bell, and now Microsoft, and amazed by how many interesting products never see the light of day. Xerox's Palo Alto Research Center (PARC) is notorious for this. IBM products usually get out the door, but are seldom promoted properly. Now we have Microsoft's labs. I was

lucky enough to visit Microsoft's facility on the first of this month.

Before you go into the labs, you get a long briefing from Executive Vice President Steve Ballmer about Microsoft's disclosure policy. The gist of it is that you can say whatever you want, but Microsoft will deny everything. Then he goes on to tell you how Microsoft does not intend to invent something in the labs to let it languish. Everything the company does will be released and promoted.

That said, I was stunned to see the direction in which Microsoft is heading. If you think Bob, that wacky Windows shell, is wild, you have to appreciate that Microsoft is going into consumer gizmos in a big way. "The potential for software is largely untapped," said Microsoft's Senior Vice President Jeff Raikes as he personally unveiled the Microsoft Sports Challenger line of athletic equipment, highlighted by the Wonder Bat.

The Wonder Bat was invented by a Bostonian coder who, as the story goes, was frustrated by watching the Red Sox. Anyway, the Wonder Bat uses a 486-based controller chip set to change the actual swing of the bat using an internal piston and some protruding air jets. The batter wears a special vest and hat that incorporate a simple sonar-based triangulation system.

Described as a kind of speed and motion detector, the system is very light and doesn't interfere with the bat swing. At the bottom of the vest is a small wire with an RJ-11 jack that plugs into the base of the bat. A thin metal film on the handle grip gives the user a short static shock when it's time to swing. The accu-

racy and speed of the bat are largely a function of the piston and the air jets. I tried the Wonder Bat and it takes some getting used to. But within about ten swings I got the hang of it and began to hit the ball solidly every time—even with my eyes closed!

The computer that controls all this is a small unit worn on the batter's back. The kernel, according to Microsoft, is Windows NT. The system adjusts for lag time between the electric shock and the actual swing, factoring in the arc of the user's swing. When the ball is out of the strike zone, no shock is sent to the batter. The system drawbacks involve the pressure needed for the air jets. Currently, the CO₂ vessel inside the bat makes the handle too fat for most users. Microsoft says it will fix the problem shortly.

Using many of the same technologies, Microsoft plans to release Wonder Skis. These products aren't as fully developed, but look like they have potential for all mediocre skiers. Again there is the radar, as well as a rather large backpack containing the computer and some air canisters. The skis themselves are pretty clunky because they're covered with compressed air jets, and a large front and back piston sit on either end of each ski to control balance.

The skis look a little like two logs.

Microsoft people call this look "futuristic." Little rudders under each ski help stabilize the user during turns. The skier wears a special pair of gloves similar to virtual reality gloves, and in one test version controls direction by pointing either hand toward the desired destination. Another prototype has a small thumb mouse to direct the skis. "A dead man could win the Olympic Giant Slalom on these skis," said Raikes.

Ideally maybe, because Microsoft had no videos or proof that these things work at all. In fact, the company seemed more enamored of the fact that the skis had a new application program interface (API) so programmers could optimize them for various skiing events. A special language called Ski Logic Object-Oriented Fortran (SLOOF) makes coding chores easy for beginners, I was told.

Microsoft intends to introduce a complete line of programmable athletic gear and will promote the super-set of the Wonder Ski API—called Logic Initiated Redundant Programmable Athletics (LIRPA)—early in 1996. "Probably right at the beginning of the second quarter next year," Ballmer told me later.

Meanwhile, within a few years Microsoft might do to the world of sports what it did to the world of computing: domination by diversification. I'll be reporting in the months ahead on other offbeat Microsoft developments including the "Smart" can-opener; a weird plan to

bring water to the world's deserts; a combination mouse and phone; a rope that, incredibly, generates sound and is believed to be the next fad in midrange speaker design; and proof that if it has the name Microsoft attached, there's credibility. Even on April Fool's Day.

*After BOB,
what's next?
Microsoft thinks
you'll flip for the
WONDER BAT and
mouse-driven
Wonder Skis, all
based on the
sporty SLOOF
API, part of the
LIRPA protocol.*

"The ZEOS® Pantera"... Most **Bang** For The **Buck.**"

— PC Magazine, September 27, 1994

It's true! The ZEOS Pantera is as good as it gets. Leading experts from top industry publications all agree that the ZEOS Pantera is the best PC available. Unparalleled in its field, the Pantera has continuously earned award after award—month after month.

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What makes the Pantera blow all others away? Superior engineering—starting with a ZEOS designed motherboard, created specifically to take full advantage of the latest technological advancements. The motherboard is stocked with exceptional features such as an on-board PCI Local Bus IDE Controller and support for up to four IDE devices. For the fastest video performance, we give you a Diamond Stealth 64-bit PCI video card *standard*.

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June 28, 1994



Pentium-60
April 1994
Pentium-90
August 1994



486DX2-66
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March 1994
June 1994
December 1994
January 1995
February 1995
March 1995

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December 1994

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February 1995

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August 1994
September 1994
October 1994
November 1994
January 1995
February 1995



Pentium-66
May 1994

Pentium-90
February 1995



Pentium-66
June 1994

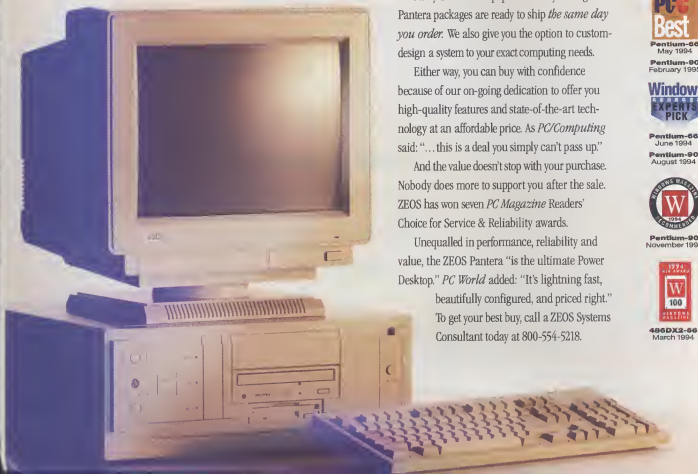
Pentium-90
August 1994



Pentium-90
November 1994



486DX2-66
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486DX2-66 \$1395	486DX2-66 \$1695	486DX2-66 \$2195	486DX2-66 \$2595
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Pentium-60 \$1645	Pentium-60 \$1945	Pentium-60 \$2445	Pentium-60 \$2845
Pentium-75 \$1695	Pentium-75 \$1995	Pentium-75 \$2495	Pentium-75 \$2895
Pentium-90 \$1995	Pentium-90 \$2295	Pentium-90 \$2795	Pentium-90 \$3195
Pentium-100 \$2195	Pentium-100 \$2495	Pentium-100 \$2995	Pentium-100 \$3395
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- 17" SVGA color monitor
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- 8.9" to 11.7" x 1.9"; 6.3 lbs.

*Orders must be for Computers Now! configurations; we've listed just a sampling here. Since we continuously update this list of configurations, please call to confirm your system is on the list. This offer is good only as long as there are those pre-built systems available in stock. Other ZEOS systems and custom configurations may take slightly longer—about a week. All orders are subject to credit approval. Monitor upgrades available on all desktop Computers Now! packages. Orders must be received by 1 p.m. Central Time, M-F.

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Circle 282 on reader service card.

TALKING BACK



I was at a party the other night when I finally couldn't stand it anymore. In the middle of a discussion between an orthodontist and a graphic designer about interrupt problems in old I/O boards, my eyeballs reared up in their sockets, my knees grew wobbly and gelatinous, and my mind began to scream "No! Augh!" in a high-pitched wheeze only

I could hear. I reeled away from that conversation and past another one that seemed to be about CD-ROMs that don't behave well with anything less than full Sound Blaster compatibility. "Aieeee!" my frontal lobe screeched. "Is there nothing worth talking about but computer-related effluvia?!" And the answer came back from the void: "Not lately."

I found a couch and settled down. To my left, a tall guy with a chinline beard was yattering on about how many megabytes of memory his hard drive had. I didn't even have the strength to correct him. I was demoralized. For years, it's been me who's bored people with obsessive cyberchat. Now I look around me and see that the rest of the world has caught up and is just as boring as I am. Take away our computers... what would we talk about?

I remember the good old days before we got our first Kaypros, when people used to aggravate each other with a wide variety of issues, including:

Politics: There were wars to be for and against. A range of domestic issues were also deemed fit to fill entire minutes at a time.

Movies: They're not interactive and sometimes involve leaving one's home, but heated conversations were often enjoyed by individuals who responded to the laughs, thrills, and, occasionally, ideas that they generated.

Books: Back when, folks read more than magazines, product documentation, and error messages. Their "minds" often got stimulated by these experiences to the point where they would share their thinking with others.

Television: The kind you could talk

back to without expecting a response.

Food & Wine: Maturation beyond the callow twenty-something years brought appreciation of the finer things. In the late 70s, I recall an entire evening enjoyably spent over a pot of something called fondue, discussing cheese. It was fun.

Sex: Not cybersex. Not virtual sex. Not sex over modem or interactive interface. Just totally retro gossip about who was zooming whom. At the time, it seemed interesting.

Miscellaneous: Occasionally, people searched around for a subject and surprised each other with the results. This art, sadly, is now lost, replaced by chat about CD encyclopedias.

The day after the party, I had a doctor's appointment. Nothing serious, mind you. After the exam, I waited in Dr. Berman's office for him to talk to me. On his desk was a Gateway 2000 subnotebook with a PC Card jutting out the side of it. The doctor came in. We shook hands. Just to make conversation before we got down to business, I said something like, "I see you have a Gateway. Like it?"

Turns out he did. So we talked about how light it was, and I wondered whether the keyboard was too small for adult-sized hands, but he swore that no, it was completely convenient, and then he showed me his PC Card and I forgot now what it was

supposed to do because I was wondering what was going on with my digestive tract now, and was less engaged in personal computing issues than perhaps I ought to be, but hey, I recognized a man in love with his computer and which of us hasn't been there? So I got the heft of the Color-Book and saw how it plugged neatly into a nearby phone jack. It was cool, I can attest to that. Finally, putting it down, Dr. B. leaned across his desk enthusiastically and met my eyes. "The thing I do with this little guy is most of my finances," he said. "And I found out this most amazing thing about the new Quicken program I got. It's incredible, but there's this bug in it. I was doing my finances the other night and all of a sudden I realize, hey, this thing won't write checks! And that's exactly what I need it to do! So I called the people at

Quicken and they were incredibly great about it and they sent me a patch on floppies to fix it and boom, it was fixed! Isn't that amazing?"

"Yeah," I said. And it was, too. Bugs are one of my most favorite subjects. The topic also provided a natural bridge to a discussion of the parallels between human and computer viruses. So then we talked about my software for a while. Turns out I'm fine. Then I went back to my office.

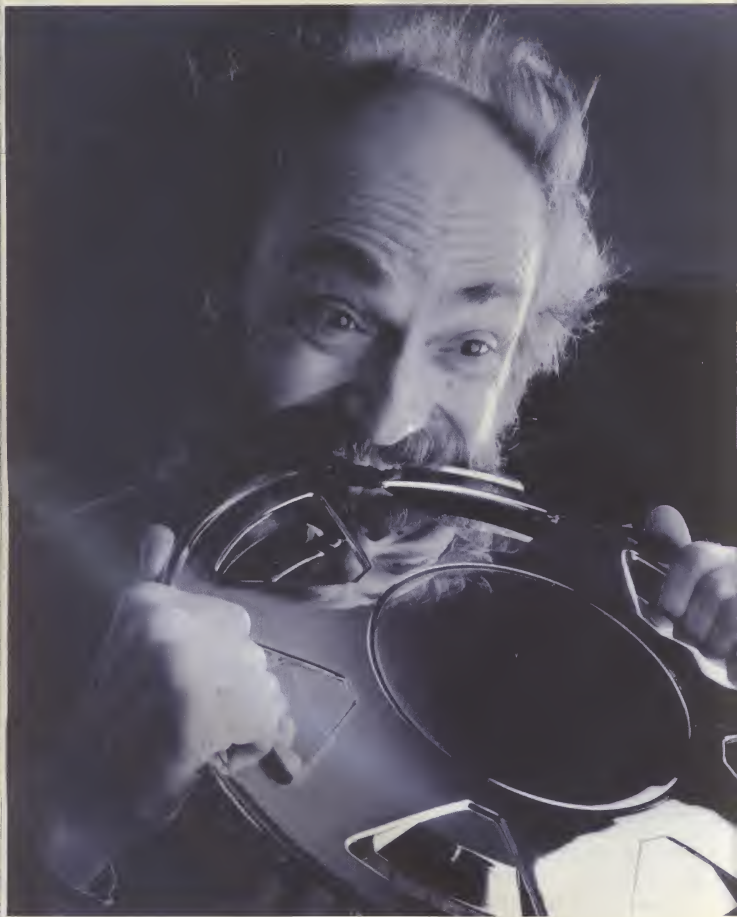
On the way up in the elevator two executive types were conversing. "No," said one, "You don't need to have compatible machines as long as the transfer protocol is established beforehand."

And I figured hey, why fight it.

So, if you've got a couple of minutes, there's this whole question of PCI slots I'd like to clarify. I mean, what the heck are they? How do they work with existing peripherals? Sit down and take a load off.

Let's talk about it.

*The WORLD is
filled with
GLORIOUS
WONDERS and
people to share
them with. So,
why talk about
HIGH-SPEED data
transmission on
this BEAUTIFUL
night?*



Since 1975, Ivan Opachevsky's somewhat unorthodox diet has included, 6 cars, 10 shopping carts, 8 TV sets, 3 computers, 1,000 record albums and a twin-engine airplane.

Because he seems to thrive on doing things the hard way, he is undoubtedly one of the few people not interested in Delrina Communications Suite.

Mr. Opachevsky knows there are easier ways to get his daily dose of iron. So he probably won't care that Delrina Communications Suite™ is the easiest way to fax and go on-line. You, however, will be pleased to learn that the world's best-selling fax software, Delrina WinFax™ PRO, and the powerful



Delrina Communications Suite includes both WinFax PRO and WinComm PRO

communications software, Delrina WinComm™ PRO, are now available together in one economical, easy-to-use package – Delrina Communications Suite. WinComm PRO gives you push-button connections to most major on-line services, like CompuServe™ and MCI Mail™. You get all the important file transfer

protocols, the most popular terminal emulations and a whole lot more. It lets you send and receive Internet e-mail off-line. Plus learning it is a piece of cake, since both applications share the same intuitive interface. WinFax PRO lets you send and receive faxes with your PC from any Windows application – eliminating countless trips to the fax machine. Sending a fax is as easy as printing a document. You can even receive faxes in the background while you work in another application. And you can organize and manage your faxes with handy drag-and-drop folders. So visit your local software dealer today, or call us at 1-800-270-8029 to order or upgrade. Once you try Delrina Communications Suite, you'll be so much more productive with your PC, you won't be tempted to eat it.



Talk about fast food... Ivan O. devoured the 290-horsepower, dual carb '60 Corvette pictured below in a mere 4 months. More important, WinFax PRO saves you from eating up time hiking back and forth to the fax machine – since you can conveniently send and receive faxes right from your PC. Plus WinComm PRO gives you double-click access to many



on-line services, and features Delrina's Internet Messenger™ for sending and receiving Internet e-mail. You can get WinFax PRO and WinComm PRO together in Delrina Communications Suite.

New! Netscape Navigator

Untangle the World Wide Web

If NCSA Mosaic was the killer app that put the World Wide Web on the map, Netscape Navigator may well be the software that finally takes people there. Netscape Navigator is faster than Mosaic, easier to use, and supports cutting-edge HTML features. NetHeads and Websters: If Netscape Navigator is not your surfboard yet, it soon will be. Net novices: If you're thinking about getting on the Web, Netscape Navigator is a great reason—and a great place—to start, particularly when it comes to usability.

Netscape Navigator's usability edge is obvious the moment you click on your first hyperlink. Unlike Mosaic, Netscape Navigator displays documents as it downloads them, and links are available the moment they appear onscreen. The result is faster surfing because you don't have to wait for an entire document to load if the link or text you want is already in view.

Click and Run For example, as soon as you see a desired link, click on it; Netscape Navigator will stop loading the document and move on to retrieving the linked document. This feature is a huge improvement over Mosaic (which still doesn't offer it as of version 2.0alpha8), and it's quickly becoming a browser standard.

Another useful feature in Netscape Navigator is its Stop button, which actually works. If you've tried clicking on Mosaic's spinning globe, you know that it stops the process only about half the time. With Netscape Navigator, however, clicking Stop will instantly abort that page no matter

where you are in the transfer, and display what has been retrieved so far. And as a kind nod to modem users, Netscape Navigator caches inline graphics from Web pages, storing them on your hard drive and loading them from there the next time you access that page (America Online and CompuServe do the same thing). This saves a substantial amount of downloading time and takes up less disk space than you might think (typically about 5K per site, though you can adjust the disk cache size to your liking).

Netscape Navigator also reads newsgroups, letting you subscribe, follow threads, and post replies right from the browser. If you're an active

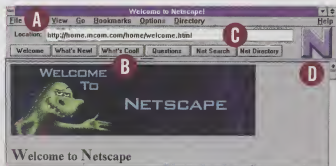
newsgroupie, you'll probably want a dedicated news reader, but for most people this built-in version will do just fine. The current version of Netscape Navigator lets you send e-mail but not receive it—watch for an e-mail reader in the next version. Likewise, look for improved bookmarking. The current version's implementation is somewhat clumsy and takes too long to load and unload from memory.

Secret Services While the competition plays catch-up trying to add these features, Netscape Navigator goes even further ahead with support for two major innovations. First, it has built-in Secure Sockets Layer (SSL) security through

RSA public key cryptography and ISO X.509 digital certificates. SSL relies on a combination of server authentication and data encryption to keep data exchange private and verifiable. Netscape Navigator uses its borders and a set of small icons to display a document's security status when you retrieve it and will warn you if you're about to send data to an unsecured site.

The second innovation is more immediately noticeable. Netscape Navigator has quickly gained notice on the Web by supporting HTML features not yet formalized into the HTML standard, including alignment of graphics, length and thickness of horizontal rules, and

OVERVIEW Navigate the Net in Style



- A. Choose your favorite Location using the easily accessible URL form.
- B. Looking for the latest? The What's Cool! button leads you to the newest Web's sites.
- C. Powerful directory and search buttons link to more than a dozen query tools.
- D. Pages designed for Netscape Navigator support blinking text and variable line thickness.

Beyond Mosaic: Netscape Navigator takes Web browsing to a whole new level, surpassing even Mosaic in usability, speed, and cutting-edge HTML page-design features.

PICKS POWERFUL RESEARCH TOOLS

Fully supported browser with advanced HTML

Netscape Navigator

No-frills free browser with support for HTML tables

NCSA Mosaic 2.0 alpha8

USABILITY: Displays documents as it downloads them so links are instantly accessible; only the bookmarking needs improvement. ****½

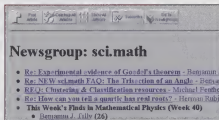
PERFORMANCE: Graphics caching to your hard disk or memory and instant document links cut your search times in half. ****½

TECHNOLOGY: Unique support for new HTML features such as graphics alignment and blinking text; Secure Sockets Layer encryption. *****

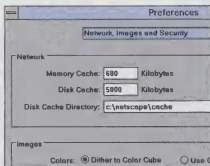
VERDICT: Pioneering new standards and taking the Web by storm. What are you waiting for? Download a copy today. ****½

GUIDED TOUR

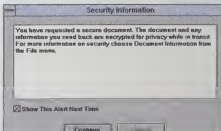
SHORTCUTS FOR SEARCHING THE WEB



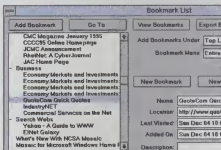
News and Gossip: Netscape Navigator displays newsgroups hierarchically. Buttons above the newsgroup title let you post and reply to articles. You can reply to the entire group or just the sender.



Name Your Preference: From the Preferences menu, Netscape lets you set the size of the memory and disk caches, and you can have it alert you when entering unsecured Web space.



Security Matters: Netscape warns you if you're about to send information to an unsecured server. Secure servers display a blue border around the document.



Confusing Bookmarks: Netscape's bookmarking feature is rich and detailed, but it's the most difficult part of the program to master. The Add Bookmarks Under and Bookmark Menu sections are confusing, as is saving bookmarks.

blinking text. As a result, pages designed for Netscape Navigator have more pizzazz than standard Web pages.

Anyone who plans to use Netscape Navigator for educational, non-profit, or evaluation purposes can download Version 1.0N from the Internet and use it at no cost (ftp to ftp.mcom.com to retrieve it). If you want a fully supported commercial version, however, order Version 1.0 for \$39 (plus \$20 for the optional documentation).

Netscape Navigator's server packages include Netsite Communications Server (\$1,495), which offers moderate security, and Netsite Commerce Server (\$5,000), a fully secure package designed expressly for Web-based monetary transactions.

Although bookmarking is rather clumsy and there's no e-mail reader (yet), these are minor flaws. Netscape Navigator has very quickly overtaken NCSA Mosaic. The competition among browsers should

heat up soon: As we went to press, Quarterdeck released a sneak alpha preview of Project Normandy, which combines the power of a Web browser like Netscape Navigator with an HTML editor like HotMetal (see "Internet Publishing Made Easy," December 1994, page 111) to let you create your own home page. But in the meantime, if you surf the Web or want to dive in, download a copy of Netscape Navigator today. **NEIL RANDALL**

FILEBOX

Netscape Navigator

Competition: NCSA Mosaic, Spy's AirMosaic, Spyglass Mosaic, and Cello, but Netscape offers better HTML tools.

Minimum System Requirements: 386 CPU, Windows 3.1, 4MB of RAM, 5MB of hard-disk space, Internet access.

Platforms Supported: Windows, Windows for Workgroups, Macintosh System 7.1, Unix versions for Sun Microsystems and Silicon Graphics workstations.

Other Features: Native JPEG image decompression, Secure Sockets Layer (SSL).

Free (ftp from ftp.mcom.com) or \$39 direct for commercial version with service and support
Netscape Communications
(800) 638-7483, (415) 254-1900
Reader Service No. 621

Guide to the Ratings

In each applicable area—usability, performance, technology, and verdict—a product is awarded from one to five stars. In some cases, other factors (such as price) also affect a product's verdict.

***** Excellent A market leader that offers exceptional performance.

**** Good Excels in a few areas; a good buy, though not perfect.

*** Acceptable Average for its class; a justifiable purchase.

** Poor Out-of-date or substandard, possibly offset by some positive features.

* Unacceptable Missing necessary features or suffering from subpar implementation; avoid.

Guide to the Ratings: ***** Excellent **** Good *** Acceptable ** Poor * Unacceptable



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Circle 162 on reader service card

Versa P vs. Armnote Pentium

Pentium Portables Take to the Road

When Pentium jokes first cracked across the Internet (Question: How many Intel engineers does it take to screw in a light bulb? Answer: 1.8763422187, but that's close enough), a raft of first-generation Pentium portables was poised to ship. The flawed CPU brought the whole show to a standstill. With the "fixed" chip now in manufacturing pipelines, NEC Technologies and ARM Computer lead the charge of long-awaited Pentium notebooks.

NEC's Versa P becomes the top-drawer portable in that company's line of notebooks. It features one of several high-resolution display options—including 24-bit color—as well as integrated 16-bit sound and the trademark versatility of the multimedia Versa M (see "NEC Captures the Rainbow," February, page 66).

Vroom What sets the Versa P apart is its speed. Powered by a 75MHz Pentium, the Versa P performed more than 16 percent faster in our Windows application benchmark tests than the Toshiba T4900CT—the first 75MHz Pentium notebook to hit the stores.

Such power has been long in coming. The 50MHz and 65MHz versions of the Pentium are too large, consume too much power, and run too hot. For almost a year, most manufacturers have opted for 75MHz and 100MHz DX4s for notebooks. However, the dime-sized 3.3-volt 75MHz Pentium uses less power than a DX4 and runs far cooler.

The Versa P is fast, but ARM's Armnote Pentium is faster. It outran the Versa P by about 13 percent in Windows



They Run Fast, Not Hot: NEC's Versa P (left) offers the advantage of a high-res screen, while the strength of ARM's Armnote Pentium (right) is in its raw speed.

Speedy Notebooks, Sluggish Batteries



NOTE: WINDSTONE TEST RUNS 18 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. ZIGZAG BATTERY RUNDOWN TEST ARCHITECTURALLY SIMULATED KEYSTROKES.

Finish Fast: The Versa P and the Armnote Pentium are the fastest notebooks we've seen. But with their shorter battery lives, this power is fleeting.

benchmark tests, thanks to a 256K L-2 cache. The Armnote Pentium is simply the fastest notebook we've ever seen. And even after several hours of use, it stayed cool as a melon.

Ta-da! Like the Versa P, the Armnote Pentium is wired for stereo-quality sound. The machine also features a 10.5-inch active-matrix color display, an IRDA-compatible infrared port, and two Type II PC Card slots.

Keyboard usability could use some work, however. Its function, Tab, and Esc keys are

too small. The up-arrow key is wedged to the right of the Shift key—a confusing arrangement we'd hate to see other manufacturers adopt.

Both the Versa P and the Armnote Pentium are built from the ground up for ultrafast performance. The Versa P offers some display advantages and has a great keyboard, but those features will cost you—about \$700 more than the Armnote Pentium. If speed is your only concern, the Armnote Pentium will serve you well.

MARTY JEROME

Versa P

USABILITY: High-resolution video, spacious keyboard, versatile. ****

PERFORMANCE: Second-fastest Pentium notebook on the block. ****½

TECHNOLOGY: Cutting-edge all the way. *****

VERDICT: Pricey, but it's a winner. ****

Armnote Pentium

USABILITY: Keyboard needs work, big screen. ***

PERFORMANCE: The fastest portable—period. ****

TECHNOLOGY: Sound, IR, and performance to boot. ****

VERDICT: If speed is your primary concern, then this is your portable. ****

FILEBOX

Versa P

Configuration Tested: 8MB of RAM, 540MB hard drive, high-resolution (800 by 600) active-matrix color display.

Expansion: Up to 40MB of RAM; 340MB, 540MB, or 810MB hard drive; two Type II PC Card slots (or one Type III); optional true-color or VGA (640 by 480) display.

\$6,099 est. street price
NEC Technologies
(800) 632-4636, (508) 264-8000
Reader Service No. 622

Armnote Pentium

Configuration Tested: 8MB of RAM, 720MB hard drive, active-matrix color display.

Expansion: Up to 40MB of RAM; 540MB or 720MB hard drive; two Type II PC Cards (or one Type III).

\$5,399 est. street price
ARM Computer
(800) 765-1767, (408) 268-9800
Reader Service No. 623

Guide to the Ratings: ***** Excellent **** Good *** Acceptable ** Poor * Unacceptable

A Wireless Window to Your Desk

SNEAK PREVIEW

As the makers of personal digital assistants and pen computers struggle to cram desktop technologies into ever-smaller boxes like circus clowns into a Yugo, Zenith Data Systems has a better idea: make the interface portable and leave everything else behind. The company's new 3.2-pound wireless tablet gives full access to a desktop PC—network included—from virtually anywhere in the office.

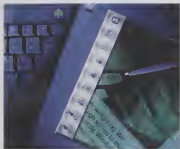
No Brain Unlike most pen tablets, the CruisePad contains no CPU, no hard drive, no RAM. Aside from a handful of ROM-based utilities, it's essentially a backlit digitizer, a battery, and a radio. Applications and data are stored in—and run from—your desktop system. The tablet's stylus is your mouse (or your fingers—the digitizer is touch sensitive). There's a small pop-up keyboard for input, and a port for attaching an external keyboard.

Actually, the onscreen keyboard is impossibly small, and pecking at it with the stylus takes patience. Blame this on the machine's cramped 8.5-inch monochrome display. (Psst, Zenith: A Windows display now demands color.) The machine's dimensions—9.8 by 10.6 by 1 inches—let you hold it comfortably in one arm while standing, freeing the other arm to write. We also like the built-in speaker, the LED panel for system status, and user-defined macro buttons. But its overall usability needs work.

The CruisePad transmits data at a rate of 1.6MB per second, though as you move away from the host's transceiver, performance drops noticeably. Communications software is embedded in the CruisePad's



Stay in Range: Now you can wander up to 500 feet in a typical office or up to 1,000 feet in an open space thanks to Zenith's wireless CruisePad tablet. It uses spread-spectrum, frequency-hopping radio signals to communicate with a desktop PC or server. Smart icons on the left side of the CruisePad's LCD tell you when you're in danger of losing the signal.



ROM, so access is initiated as soon as you turn on the tablet. The radio uses a spread-spectrum, frequency-hopping band in the 2.4GHz to 2.4835GHz range for coverage of up to 500 feet in most offices and 1,000 feet in open spaces.

These distances are optimistic for offices with many walls. You can enhance coverage by increasing CruiseLAN Access Points, but at \$1,899 per radio module, costs mount quickly. Zenith also offers a CruiseLAN ISA card for workstations (\$599) and a PC Card for portables (\$699).

Hip Hop Frequency hopping, in which the radio and transceiver automatically switch frequencies during a transmission, thwarts electronic eavesdroppers. In addition, data is

encrypted during transmission, and the CruisePad provides password protection. And since the device stores no data itself, there's no threat of secrets getting into the wrong hands should the unit be stolen.

Zenith has rightly aimed this technology at markets such as hospitals, financial industries, and factories, where workers who spend much of their days on their feet can get speedy access to centralized databases. It makes getting at that data tremendously easy, but changing the data is far more laborious. Most businesses will need to ask themselves whether, in dividing the interface from the desktop PC, the CruisePad makes computing twice as accessible—or merely twice as expensive. **MARTY JEROME**

USABILITY: Provides access to all your data, but it's hard to read or change. ***
PERFORMANCE: Faster than a phone line, if you don't stray too far. ***
TECHNOLOGY: Hail to the first portable interface; now how about some color on that LCD? *****
VERDICT: Great for specific industries, but it's not for everyone. ***

Walking Interface:

Zenith's 3.2-pound CruisePad gives you full access to the applications and files on your desktop PC and network from a tablet-sized display.

FILEBOX

CruisePad

Wireless Communications: Spread-spectrum, frequency-hopping radio, 2.4GHz to 2.4835GHz frequency band, 1.6Mbps data rate.

Range: Up to 500 feet in office environments and 1,000 feet in open spaces; extended roaming range possible with CruiseLAN Access points.

Battery: Nickel metal hydride.

\$1,399 est. street price; \$1,899 per additional Access Point
Zenith Data Systems
(800) 533-0331
Reader Service No. 624

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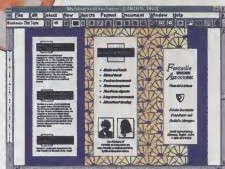
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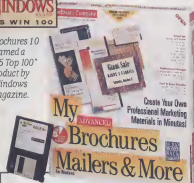
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MySoftware Company™

Over 1 million satisfied customers.

Toshiba Spins Multimedia to the Top

**SNEAK
PREVIEW**

Take Toshiba's award-winning 4.4-pound Portégé T3600CT sub-notebook, with its classic lines, high-touch keyboard, eye-popping color display, and long battery life. Then pump it full of protein powder, silicon, and multimedia razzle-dazzle, and you have the newest muscle machine on the beach, the Toshiba T2150CDT.

Although this new Toshiba is officially part of the budget-oriented Satellite line, you wouldn't know it by looking at the system or its feature list. Reflecting a permanent shift in Toshiba's design for portables, the Toshiba T2150CDT is the identical twin of the diminutive Portégé T3600CT—but it's bigger in all the right places.

Portégé Plus The Toshiba T2150CDT has the same full-travel keyboard with embedded pointer and ergonomic palm-rest as the Portégé T3600CT, but its keyboard is larger and more comfortable. It also has the same active-matrix color LCD, but it's a full 10.4 inches instead of just 8.5 inches. The hard disk? Bigger. The memory limit? Higher.

For its enhancements, the Toshiba T2150CDT carries a few more pounds and a few more inches than the 4.4-pound Portégé T3600CT. But the Toshiba T2150CDT makes great use of that space and weight by including a dual-speed CD-ROM drive and a built-in AC adapter/power supply. Still, its total traveling weight is only 6.9 pounds.

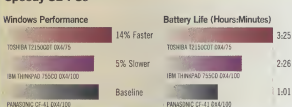
No Pain for the Gain When it comes to performance, the Toshiba T2150CDT packs quite a bit of power in its muscle. In fact, we clocked speeds that were faster than some



Portégé on Steroids:

Running off a 75MHz DX4 processor, the Toshiba T2150CDT outpaces even 100MHz CD-ROM portables like the Panasonic CF-41. Its battery outlasts other CD portables too.

Speedy CD PCs



NOTE: WINDSTONE 95 RANKS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. 210-SET BATTERY RUNDOWN TEST ELECTRONICALLY SIMULATES COMMON USER ACTIVITY.

100MHz DX4s that we've tested. And like Compaq's Elite, the Toshiba T2150CDT carries its own AC adapter. Battery life is more than three hours on a single charge.

The Toshiba T2150CDT's one idiosyncrasy is its sidecar floppy. Years of market research show that floppy drives don't do anything for the average portable bearer. Yet floppies are still a weight-, space-, and power-wasting fixture on most portables. Our advice? Leave the Toshiba T2150CDT's lightweight sidecar in your garment bag and forget about it.

The subnotebook's built-in CD-ROM drive is another matter. With CD-based software sales up more than 250 percent in 1994, it's a rare productivity application—not to mention game or movie—that

you won't find on disc by year-end. Similarly, you can carry CD versions of your company's inventory, training manuals, or even video-bedecked sales presentations.

Double Take Which leads us to the big question: What's all of this going to cost? Fully loaded, the subnotebook sells for between \$4,899 to \$5,199 on the street—much less than other CD-ROM-equipped portables like the \$6,599 Panasonic CF-41 and IBM's \$8,149 ThinkPad 755CD (see "Multimedia in an Overnight Bag," February, page 59). And if you're on a tighter budget, the nearly identical Toshiba T2150CDS with a passive-matrix display sells for less than \$3,999. Either way, the Toshiba T2150CDT or T2150CDS are the CD portables to buy.

MIKE HOGAN

USABILITY: Crisp 10.4-inch screen, superb keyboard layout. *****
PERFORMANCE: Makes 75MHz CPU feel like 100MHz. *****
TECHNOLOGY: Vesca local-bus video. *****
VERDICT: The way to travel with CDs. *****

Can't Lose: The Toshiba T2150CDT borrows the best from the time-tested Portégé T3600CT and adds big-ticket multimedia like a built-in CD-ROM drive, a bright 10.4-inch display, and 16-bit sound. And did we mention that it's fast?

FILEBOX

Toshiba T2150CDT

Competition: The Panasonic CF-41 and IBM's ThinkPad 755CD are two tough competitors, albeit much more expensive.

Features (as tested): 75MHz 486 DX4 with math coprocessor, 8MB of RAM (expandable to 32MB), 14ms 500MB hard drive, 385ms dual-speed CD-ROM drive.

\$4,899 est. street price (as tested)
Toshiba America Information Systems
(800) 334-3445
Reader Service No. 625

Stun Them with a Color Phaser

If you've been able to hold yourself back from the knock-out color laser printers released in the past year, you're in fine shape. Tektronix's new Phaser 540 color laser printer offers a host of advantages not found in earlier models from Hewlett-Packard, QMS, and Xerox—and it's competitively priced.

Most impressive about the Phaser 540 is its capability to print continuous-tone color—that is, it can print true color without having to simulate dithering patterns to make the eye “think” it's seeing color. The results are smooth graphic images (especially photographs) and rich colors.

Setting up the Phaser 540 requires about as much time as any of the other color lasers. One annoyance is that the Phaser 540's parallel port is non-standard: It's not the same size as any other printer's, and the special cable that's required is not sold with the printer. You'll have to purchase this \$50 cable separately when you get the printer.

In addition, the software drivers, while simple to set up, give you minimal control over color options and output quality. We'd like to see more graphical examples of the features in the software and more control for the user over the type of output quality desired.

Smooth Tones If you plan to use your color laser to print mostly photographic images, the Phaser 540 is one step ahead of its competitors. Color images are rich and even, although they do have a tendency to be dark.

When printing a business presentation, the Phaser 540 produced smooth, color-rich backgrounds. However, blacks were not as clearly defined. As



A Box of Color: Tektronix's Phaser 540 color laser produces rich, even, continuous-tone color images, but its black-and-white output isn't as crisp as that of HP's Color LaserJet or QMS's magicolor.

Anticipation: While the Phaser 540 didn't post record speeds, it was slightly slower than HP's Color LaserJet, the faster color laser we've tested.

Good Color Takes Time

Color Presentation



a result, its printouts didn't look quite as crisp as those of its competitors. This was especially apparent with text-heavy documents. While the Phaser 540 can produce well-defined text, the characters lack the sharpness of the text produced by Hewlett-Packard's Color LaserJet or the rich blacks of QMS's magicolor.

Print speeds with the Phaser 540 were impressive. While not quite as quick as the Color LaserJet, the Phaser 540 was consistently faster than the magicolor and Xerox 4900 Color Laser Printer.

The Phaser 540 also offers a feature you won't find on other desktop color lasers: a

copy station. Reminiscent of a desktop scanner, the copy station (a \$1,695 option) lets you produce multiple copies of a document without having to use a computer or access a file. In addition to providing multiple copies of a document, you can also reduce or enlarge an image or make adjustments such as contrast to the original much like with a dedicated copy machine.

Cross-Platform If you're in a Mac/PC environment, the Phaser 540 ships standard with Adobe PostScript Level 2, in addition to PCL5 and HP-GL. The standard 20MB of RAM means that you can print complex graphics images without

USABILITY: No-frills setup, proprietary parallel interface. ***

PERFORMANCE: Competitive with HP's spy Color LaserJet. ****

TECHNOLOGY: First desktop continuous-tone color laser—brilliant! *****

VERDICT: Superb color graphics, competitively priced. ****

FILEBOX

Phaser 540

Competition: Hewlett-Packard's Color LaserJet, QMS's magicolor, and the Xerox 4900 Color Laser Printer will save you \$500 or more, but the Phaser 540's continuous-tone color output is more advanced for printing color graphics.

Resolution: 600 or 300 dpi.

Cost per Page: 15 to 35 cents per page depending on coverage of page.

Memory: 20MB standard, expandable to 52MB.

\$8,995 list price
Tektronix
(800) 835-6100, (503) 882-7370
Reader Service No. 626

having to purchase extra memory, though you can expand the Phaser 540's memory to 52MB. Optional Ethernet, Token Ring, and AppleTalk cards offer direct connections to a host of network protocols.

All in all, Tektronix's Phaser 540 is a welcome addition to the growing world of desktop color laser printers. It offers a new standard for photographic images, though you do pay a slight premium for the higher quality images. Its black-and-white text printing doesn't quite match what you'll get from HP and QMS's color lasers, but its continuous-tone color images are the best in the business. **KYLA K. CARLSON**

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DSP Boards Catch an Mwave

The latest wave in audio and communications is Mwave, IBM's powerful and programmable digital signal processor (DSP). Spectrum Signal Processing's OfficeF/X and Best Data Products' Ace5000 are among the first multifunction boards to catch this wave, and the results feel a lot like multimedia surfing.

A DSP chip like the Mwave improves sound and telephony functions by freeing them from their dependence on the CPU, thereby giving them the full-time attention they demand and allowing them to operate in the background. And since a DSP can process almost any type of digital signal, the Mwave also lets the OfficeF/X and Ace5000 boards mix audio and communication features.

Digital Voice Mail Both the OfficeF/X and Ace5000 combine 14.4Kbps fax and data modems with digital voice mail and 16-bit Sound Blaster-compatible stereo sound. Because the Mwave can be upgraded via software, both boards also promise easy alterations such as raising the modem speed to V.Fast (28.8Kbps). In short, both make great home-office multimedia command centers.

The OfficeF/X is the easier of the two cards to install. Just plug the card in, load the software, and you're in business. Installing the Ace5000 requires setting tiny jumpers that are prone to bending. On the other hand, finding room for the OfficeF/X card might be difficult in certain systems. While it's only an inch or so longer than the Ace5000, that's enough to require a full-length slot in many PCs. Both boards are tall as well (rising about three-quarters of an inch above their metal brackets), which can



Multimedia Switchboards: The OfficeF/X and Ace5000 boards use IBM's Mwave DSP to mix audio and communications features so you get a full-duplex speakerphone and fax modem on a single card.

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Spectrum OfficeF/X

Less polished, but all the features are there

Best Data Ace5000

PC Operators: The Ace5000 costs about \$50 less than the OfficeF/X, but easier installation and better integration make the OfficeF/X a better buy.

be a problem if you have one of those low-profile systems.

Universal In-box The software that controls the OfficeF/X's many functions is a mix of familiar and familiar-looking programs. Delrina's WinComm Lite and WinFax Lite are included for managing its modem-related duties, while Spectrum's own SwitchBoard software provides a full-duplex speakerphone, a contact manager, a call-notifying feature (with caller ID support), and a single in-box for e-mail, voice mail, and faxes. There's also an Internet e-mail program, as

well as audio rack and controller utilities that look and work like stereo components. The OfficeF/X even comes with two gaming bonuses: a joystick/MIDI port and the bloodthirsty game Doom.

While the Ace5000 doesn't play games, it's capable of doing just about everything else that the OfficeF/X can do. Smith Micro's QuickLink Message-Center helps you to manage your communications chores—including voice mail—and a series of component-like utilities controls its audio features. Caller ID and speakerphone

OfficeF/X

USABILITY: *Jumpierless installation, only single-line telephone support. *****

VERDICT: *An excellent multimedia switchboard for one. ******

Ace5000

USABILITY: *Setup and manuals could be made simpler, only single-line telephone support. ****

VERDICT: *A solid compilation that only lacks better integration. *****

FILEBOX

OfficeF/X

Features: 14.4Kbps fax modem, voice mail, 16-bit sound, MIDI/joystick port.

Warranty: One year.

\$299 est. street price
Spectrum Signal Processing
(800) 967-0018
Reader Service No.627

Ace5000

Features: 14.4Kbps fax modem, voice mail, 16-bit sound.

Warranty: Two years.

\$249 est. street price
Best Data Products
(800) 632-2378
Reader Service No. 628

support are optional, but there are several nice telephony touches such as fax on demand and pager notification.

However, there's one key limitation to both of these cards: While they can discriminate between voice, fax, and data calls, neither accommodates more than one phone line. Overall, the OfficeF/X is a little slicker and a bit more complete, but the two vary more in subtle voice-mail details than basic functions. And at street prices of under \$300, both qualify as tremendous bargains.

CHRIS O'MALLEY

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Standards MPR-II, TCO

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Dot Pitch 0.28mm
Scan Freq. H:30-69kHz, V:55-120kHz
Res. Resol. 1024 x 768 @ up to 87Hz
Max Resol. 1280 x 1024 @ up to 66Hz
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New! **HARDWARE:** Power Macintosh 6100 DOS Compatible

Apple's Quick-Change Artist

In most offices, there are PC people and there are Mac people. But sometimes corporate standards or the need to use a specific program force people to go both ways. That used to require a bigger desk or a Mac running Windows painfully slow via software emulation. With Apple's new Power Macintosh 6100 DOS Compatible, you get a no-holds-barred Mac and PC all in one.

The key is the hardware. Inside the new Mac you'll find a 66MHz PowerPC, a 66MHz 486DX2, 16MB of RAM, and a 500MB hard drive. Two CPUs provide great performance under System 7 and Windows. The Power Macintosh 6100 cruised through our Windows benchmarks, outpacing a 33MHz 486-based Compaq Deskpro 433i. And while it didn't measure up to a



Intel Inside: Apple's Power Macintosh 6100 runs Mac and Windows software.

full-fledged 66MHz 486DX2 in every test, it's far superior to any previous Mac/PC solution. This time the Power Macintosh 6100's 486 CPU delivers true 66MHz speed and impressive graphics performance.

With all this speed comes great usability. You can cut and paste between Windows and System 7, and both CPUs will run at the same time. To

keep track of the dual operating systems, you can either attach two monitors (no special hardware required) or switch back and forth on the same monitor with a simple set of keystrokes.

Another bonus is the built-in Sound Blaster-compatible 16-bit sound system. This gives you complete multimedia once a CD-ROM drive is added. Windows and System 7 will share the CD-ROM drive, just as they share the floppy drive, hard drive, and memory. You can even add memory directly to the DOS compatibility card for better performance.

If you're splitting your time between a Mac and PC, Apple's new Power Macintosh 6100 DOS Compatible can save you money and desk space, with no performance trade-offs on either side. **ADAM MEYERSON**

USABILITY: As easy as a Mac, a PC, and toggling. ****
PERFORMANCE: No sacrifices in speed. ****
TECHNOLOGY: Runs Mac, Power Mac, Windows, and DOS programs. ****
VERDICT: System 7 and Windows with no performance hit. ****

FILEBOX

Power Macintosh 6100 DOS Compatible

Features (as tested): PowerPC 601, Intel 66MHz 486DX2, 16MB of RAM (8MB for Windows, 8MB for System 7), 500MB hard drive, 16-bit Sound Blaster chip set.

Software: System 7.5, Windows 3.1, DOS 6.22, support for NetWare IPX and TCP/IP.

\$2,759 list
Apple Computer
(408) 996-1010, (800) 776-2333
Reader Service No. 631

DECwriter 90ip

DEC's Portable Road Writer

If you're in search of speedy, high-quality on-the-road printing, the DECwriter 90ip might just fit the bill. That is, as long as you don't mind the extra 4 or 5 pounds it adds to your traveling weight.

The DECwriter 90ip produces sharp ink-jet output that makes you look good as you close that contract on the spot. Text output is a deep, rich black, though not quite as crisp as the laser output we've all grown accustomed to.

For its size, the DECwriter 90ip churns out complex documents at a rapid clip. But compared to Hewlett-Packard's Deskjet 320 ink-jet printer, the



Prints Charming: Output from the DECwriter 90ip is rich, though this printer is heavy for a portable ink jet.

DECwriter 90ip was about 40 percent slower for graphics and about 25 percent slower when printing text.

The best part about the

DECwriter 90ip's portability is that it will run off of ten AA batteries in a pinch, and these can be bought almost anywhere in the world. It also comes with a NiCad battery pack, which is good for about 80 pages on a single charge.

The DECwriter 90ip is a solid and affordable portable printer that's best suited for shorter hauls. For longer stints, consider the Citizen PN60 (see "Is That a Printer in Your Pocket?" February, page 64), which is a full 2 pounds lighter. If you travel a lot, the bulky DECwriter 90ip may be more ballast than you want in your briefcase. **KYLA K. CARLSON**

USABILITY: Runs off AA batteries in a pinch. ***
PERFORMANCE: Slower than HP's Deskjet 320. ***
TECHNOLOGY: Integrated sheet feeder is a plus. ****
VERDICT: A solid, inexpensive portable printer. ***½

FILEBOX

DECwriter 90ip

Competition: Hewlett-Packard's Deskjet 320 offers color at a higher price, and the Citizen PN60 and Pentax's PocketJet are smaller but cost more.

Cost per Page: 10 cents.

\$299 est. street price
Digital Equipment Corp.
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- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3**
- Bookshelf™ '94 & Money
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- PCI Enhanced IDE Interface
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- Quad-Speed CD-ROM
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- 3.5" Diskette Drive
- TelePath IIv 14.4K Fax/Modem Communication Center
- 17" Vivitron Color Monitor
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PRINTER PRICE

Phaser 340

Color Laser

Source: PC Magazine November 22, 1994 Business Printer Review

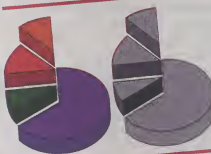
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Sales-O-Gram

To: All Sales Representatives
From: Kenton O'Keefe
Sales Manager
Subject: Persuasive power of color presentation

- Color increases ad readership 39%
- Color ad increases sales 42%
- Color documents provide 70% time savings, 39% decrease in errors
- Color improves attention, comprehension, recall and recognition



Color improves recall and recognition performance compared to black and white.

We've seen that, in general, presentation is powerful. Let's look now at the benefits of presentation visuals.

Color is all around us in our everyday lives. We probably don't think much about color and how it affects us. But, imagine with all the lights the same color. How would the traffic light be? Color can produce a stronger response in the viewer.

For example, adding color to a map can increase ad readership 39%. One newspaper color ad can increase sales with the same as in black and white. A decision type documents experience time and a 39% reduction in errors. The same documents in black and white.

Research shows that color improves attention, recall and recognition and white.

% Greater Impact:	Color Visuals
Action	55
Retention	54
Agreement	75
Comprehension	70
Attention	15
Perception	

[1] CARR Report No. 110.1A "Does Color Increase Advertising Readership?", Colvers Publishing Co.
[2] "Update on split run tests on sales effectiveness of BOP color ad #20"; Internal report of color versus black and white ads, 1988, Newspaper Association of America

[3] From a study conducted by Company, Xerox Public Information, [Borges, et al., "Recall and Recognition of Children," Bulletin of

Color is color, unless it's

It's the business printer you've been waiting for. Office color that's so easy to use, reliable, and inexpensive, it's a practical office tool. It's the new Tektronix Phaser™340 color printer.

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Connect faces and places with photorealistic quality. Welcome to the world of practical color!



brilliantly practical.

this machine. Reliability? Add 750 sheets of paper and let it run overnight. Now, that's robust. Cost? At \$4,995 there's nothing in its performance range that even comes close. Best of all, it's from Tektronix, a

Fortune 500 leader, that's been making world-class color printers for 13 years. **The Phaser 340 Color Printer.** So practical, it's brilliant.

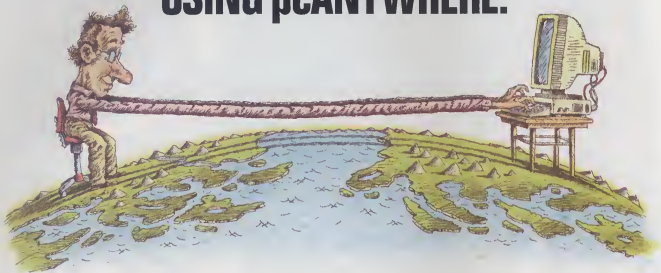


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Norton pcANYWHERE is the most advanced implementation of remote computing technology available, made easy. But don't take our word for it. Millions of people have already expanded their growing work environment with Norton pcANYWHERE.

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**NEW
VERSION
2.0**

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The Peter Norton Group has made remote computing easier for everyone with Norton pcANYWHERE.

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M.Y.O.B. 5.0 vs. Profit 2.0

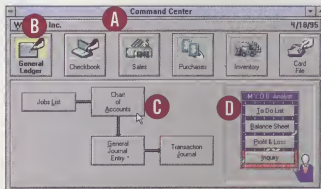
A Better Way to Balance the Books

Small-business accounting can be a dirty job, but somebody has to do it. If that somebody is you, and you don't have the time, background, or patience for balancing the books, consider the latest Windows offerings from BestWare and Great Plains: Mind Your Own Business 5.0 and Profit 2.0.

Both M.Y.O.B. and Profit are much easier to use and much less expensive than traditional, multimodule accounting programs aimed at larger companies. And both offer thoughtfully planned menus of all the standard accounting side dishes: payables, receivables, inventory tracking, and so on. Auxiliary accounting modules for things like payroll will cost you extra, but handy to-do lists, calendars, and contact organizers are included.

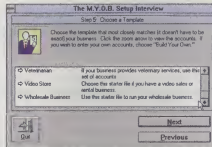
Follow the Leaders While neither product is the leader in this category—Intuit's QuickBooks 3.0 for Windows took that title after a challenge from Peachtree Accounting 3.0 (see "Taking Inventory of QuickBooks," February, page 104, and "Book Balancing Made Better," October 1994, page 88)—no single accounting program fits all. However, the popularity of QuickBooks confirms that ease of learning, ease of use, and flexibility are very important to users. M.Y.O.B. and Profit do a good job matching QuickBooks on the first count, but they aren't quite as easy to use or as flexible.

M.Y.O.B. and Profit bend over backward to make setup easy, with hand-holding every step of the way. M.Y.O.B. even adds a useful installation video



Accounting Command Central: BestWare's M.Y.O.B. 5.0 puts a clean, highly usable interface on the sometimes dirty job of small-business accounting.

Choose Your Business: M.Y.O.B. lets you customize its interface to match your needs, starting with templates for 100 types of businesses.



and a CD-ROM with straightforward online help. Both use familiar onscreen forms so that checks, registers, and invoices look just like their paper counterparts—very comfortable.

Debits and Credits Version 5.0 of M.Y.O.B. has a new look that takes advantage of the file-folders-with-tabs metaphor that is becoming de rigueur among Windows programs. A face-lift has made this version easier to set up, its reports easier to lay out, and general user preferences more accessible to on-the-fly changes. BestWare has also done some under-the-hood tuning that eliminates database drudgery of the past. You now get automatic file

backup, data fields that fill in automatically after you type the first few letters of information, easier printing from any window, and an easier way to add new records to the card file.

While none of these features distinguishes M.Y.O.B. from the market leaders, at least the program is keeping up. Where it doesn't keep up is in executive information services (EIS). M.Y.O.B.'s quick graphs of key business indicators are useful but limited in number. Similarly, its lengthy list of preformatted business reports (an aged payables summary is one example) can't be displayed graphically or customized and saved to create new ones.

M.Y.O.B. 5.0

USABILITY: Lots of hand-holding during setup, but customizing templates could be easier. ***½
VERDICT: Cheaper and easier than DOS-based programs for accounting. ***

Profit 2.0

USABILITY: Highly structured format is both an asset and a liability. ***½
VERDICT: If you demand GAAP compliance, Profit is a safe bet. ***½

A. Everything proceeds from M.Y.O.B.'s Command Center: General Ledger, Checkbook, Sales, Purchases, Inventory, and Card File.

B. Click the Command Center's General Ledger button and an easy-reference flowchart pops up to show you the relationship between the Chart of Accounts and the General Journal Entry.

C. Click a box on the flowchart and the appropriate file folder opens up.

D. M.Y.O.B.'s Analyst provides quick access to common EIS reports like Balance Sheet and Profit & Loss as well as a To-Do list and Inquiry for quick answers. The Analyst also gives you one-button access to basic inventory analysis.

At the heart of every accounting system is a chart of accounts. M.Y.O.B.'s eight types of accounts—assets, liabilities, income, expense, equity, cost of sales, other income, and other expenses—are tailored to match your business's needs thanks to predefined templates for 100 business types (see smaller screen above).

M.Y.O.B.'s Purchases and Payables feature lets you easily record purchasing transactions and make payments to vendors, as well as print purchase orders, settle purchasing activity, and analyze purchasable and payable status. Purchasing transactions are smartly organized into five types: items,

New! SOFTWARE: M.Y.O.B. 5.0 vs. Profit 2.0

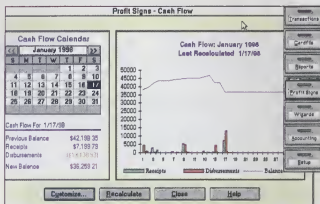
services, professional, pending, and other (for example, purchases that don't require a printed order). Make a mistake? Reversing purchase orders is as simple as selecting Reverse Purchase from the Edit menu.

Turn a Profit Compared to M.Y.O.B., Profit offers a considerably wider array of EIS services for quick access to your company's vital signs. Graphs for cash flow, balance sheets, and other items pop up quickly from the Profit Signs drawer of the file cabinet. They are customizable enough to be convenient, and easier to use than corresponding reports in QuickBooks. On the other hand, QuickBooks lets you double-click a graph point and drill down through reports to access the origins of their data, a handy feature not found in Profit or M.Y.O.B.

Profit languished under Microsoft's exclusive marketing rights, but now it's back on the prairie where customer hand-holding is a way of life. In fact, Great Plains wants you to call. If you haven't called to register Profit by your 25th use of the program, it shuts down until you call the company to request the code to unlock it. Why such extremes? The company wants to make sure you have the latest tax and payroll information.

Microsoft's main contribution to Profit seems to have been the concept of Wizards. As implemented by Great Plains, they carefully guide you through setup and functions such as budgeting, period closing, bank reconciliation, and billing. Like M.Y.O.B., Profit queries you about your business, then tailors a chart of accounts to fit your service, product, and/or enterprise.

Profit can also split transactions and distribute them across as many as 20 different accounts. And if you'd rather view reports and analyze the



Profit's Cash Prophet: Great Plains' Profit 2.0 gives you an at-a-glance read on sales, cash flow, profit, inventory, and other vital signs with a quick graph from the Profit Signs drawer of the file cabinet. Clicking on a graph point shows where data resides.

PICKS KEEP YOUR BOOKS

Double-entry bookkeeping with limited, easy choices

BestWare M.Y.O.B. 5.0

Sophisticated EIS graphing and GAAP compliance

Great Plains Profit 2.0

The easiest, most flexible bookkeeping around

Intuit QuickBooks 3.0

Dollars and Sense: M.Y.O.B. 5.0 and Profit 2.0 match market leader QuickBooks 3.0 for Windows in core features. But for usability, QuickBooks is the winner.

current health of your business through another application, Profit transfers data easily into Lotus 1-2-3 for Windows, Microsoft Excel, Microsoft Word for Windows, and other popular applications. You can also build and save as many as 18 custom forms.

Into the GAAP The bad news? Great Plains is sworn to uphold the formalities of Generally Accepted Accounting Principles (GAAP), which means that Profit wants you to do things the GAAP way. The program makes you spend more time than most setting up

your databases of vendors, customers, and inventory before it lets you get to work, and it doesn't like deviation. For example, select a user ID from a pull-down menu, and Profit conveniently fills in the rest of a record. But start typing a customer name instead, and Profit doesn't have the intelligence to fill in the rest of the record for you. Similarly, it won't fill in field names after you've typed in the first few letters.

Neither M.Y.O.B. nor Profit measure up to the ease-of-use standards set by the most recent versions of QuickBooks and

FILEBOX

M.Y.O.B. 5.0

Competition: QuickBooks 3.0 for Windows, Peachtree Accounting 3.0, Profit 2.0.

Minimum System

Requirements: 386 CPU, Windows 3.1, 4MB of RAM, 6MB hard disk.

Support: Toll call first 30 days, \$79 per year thereafter; CompuServe support also available.

579 est. street price (\$139 with payroll module)
BestWare
(800) 851-1315, (201) 986-2200
Reader Service No. 637

Profit 2.0

Competition: QuickBooks 3.0 for Windows, Peachtree Accounting 3.0, M.Y.O.B. 5.0.

Minimum System

Requirements: 25MHz 486SX, Windows 3.1, 6MB of RAM, 16MB hard disk.

Support: Toll-free first 30 days, \$349 per year or \$2 per minute thereafter; BBS support also available.

\$249 est. street price (\$299 with payroll module)
Great Plains
(800) 456-0025, (701) 281-0550
Reader Service No. 636

Peachtree Accounting, QuickBooks in particular offers more flexibility, especially for newcomers to the world of accounting software. M.Y.O.B. is more malleable than Profit—you can make changes to your card file on the fly, you don't have to close periods, and installation and setup are a snap with video and CD-ROM help. On the other hand, if you're fiscally conservative or need a little financial discipline, GAAP methods and Profit's strict adherence to those standards could be a plus—and it features robust EIS to boot.

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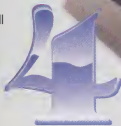
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PC Magazine, UK
July 1994

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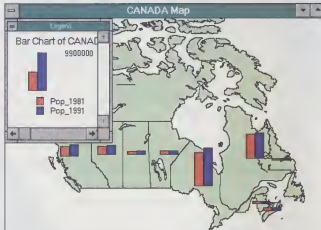
Put Your Business on the Map

If a picture is worth a thousand words, then surely a map is worth ten thousand. Nothing places data in perspective quite like seeing it displayed on a map, whether it's viewing the distribution of clients within a sales territory or putting charts and graphs within the context of a geographic region.

Professional-level statistics packages display data on color-coded maps, and you can pair data in Microsoft Excel with Shapeware's Visio to create a rudimentary color map of the United States. But for sophisticated geographic data analysis, you'll want a full-fledged mapping program such as Atlas GIS 3.0 or MapInfo 3.0. Both contain a rich collection of tools for analyzing geographically linked data in context.

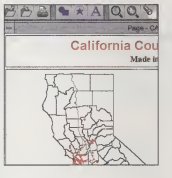
Plotting Points The underlying model used by Atlas GIS and MapInfo is the same. Both packages come with an extensive collection of statistics and geographic information already built in, or you can add your own data using a process called *geocoding*—linking a field in your data to a geographic region. In addition, both programs display maps as vector graphics, so they can be easily scaled to the proper size. You can also add text annotations to maps and draw boxes and arrows to highlight data or regions without affecting the underlying image.

But that's where the similarities between these programs end. Atlas GIS has a more modern and usable interface, with goodies such as a button bar, right-mouse menus, and easy-to-understand dialog boxes. Also, Atlas GIS's maps can be copied to the clipboard as scalable metafiles, while MapInfo allows only simple bitmaps.



Artful Demographics: The most powerful of the two mapping programs, MapInfo 3.0 can produce maps that show bar graphs by region. The map above illustrates Canadian population growth by province.

First, the Hard Part: The learning curve for both Atlas GIS 3.0 and MapInfo 3.0 is steep, although Atlas GIS (right) makes navigation a little easier with its large, accessible button bar and well laid out dialog boxes.



And at \$495, Atlas GIS is more attractively priced. The CD-ROM version of Atlas GIS even includes address data for the entire United States.

Trade-offs For \$1,295, MapInfo offers slightly more power, such as the capability to associate charts or graphs to geographical regions, and a fully relational database engine. Atlas GIS, by contrast, does its jobs by copying data into a new table, which eliminates links to the original data.

Still, these programs are relatively hard to use. While Atlas GIS is the more approachable of the two, both have steep learning curves, particularly

for the more advanced charting and analysis features. And though both packages include detailed manuals to get you started, there's lots of room for improvement: Both cry out for step-by-step online tutorials to walk you through the more difficult concepts.

In any business setting that requires the analysis or communication of data with a geographic component, mapping software can be an invaluable tool. Atlas GIS is the easier and less expensive way to map your data, although MapInfo's fully relational database engine and charting features still give it an edge.

BARRY SIMON

Atlas GIS 3.0

USABILITY: Large Lotus SmartSuite-like button bar and right-mouse button controls ease the steep learning curve. ****½

TECHNOLOGY: Doesn't retain live relational links to data, which makes updating charts a chore. ***

VERDICT: The cheaper and easier of the two programs to learn, but the trade-off is power. ****½

MapInfo 3.0

USABILITY: Not as approachable as Atlas GIS, and a difficult program to master. ***

TECHNOLOGY: Fully relational database underpinnings; lets you link charts and graphs to maps. ****

VERDICT: Pricy, but the most thorough mapping program you can buy. ****½

FILEBOX

Atlas GIS 3.0

System Requirements: Windows 3.1, 4MB of RAM (8MB recommended), 24MB of disk space (with optional geodata).

Scripting Language: Atlas Script/C and Atlas Script/VB (sold separately for \$495 each) link to C++ and Visual Basic.

\$495 est. street price
 Strategic Mapping
 (800) 472-6277, (408) 970-9800
 Reader Service No. 637

MapInfo 3.0

System Requirements: Windows 3.1, 4MB of RAM (8 MB recommended), 13MB of disk space.

Scripting Language: MapBasic (sold separately for \$795 as a stand-alone language).

\$1,295 est. street price
 MapInfo Corp.
 (800) 327-8827, (518) 285-6000
 Reader Service No. 638



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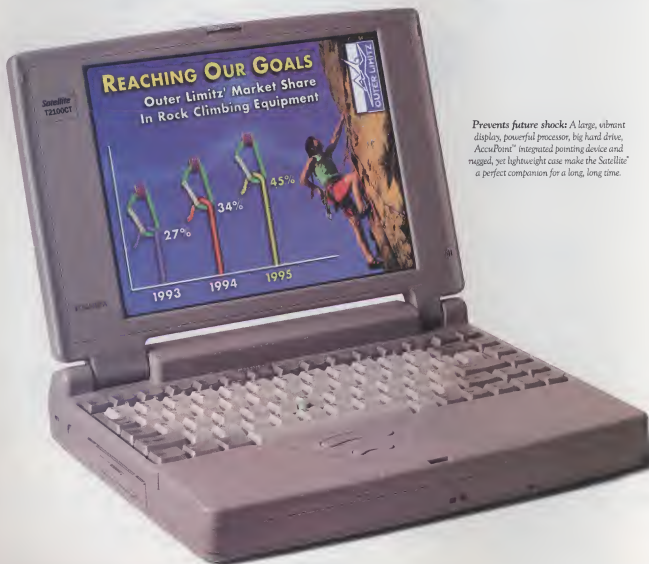


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- AccuPoint™ integrated pointing device
- Optional Port Replicator
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- Plug and Play connectivity
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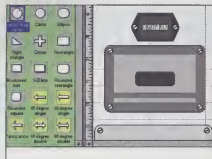
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Visio Takes the CAD out of Design

The tyranny of the AutoCAD crowd is over. Visio Technical 3.0, a new version of the highly regarded Visio drag-and-drop drawing program from Shapeware, lets you create your own precision drawings without a CAD package—or a very precise hand. Better still, it lets you view (and gasp!) suggest changes to AutoCAD drawings you get from others.

Visio Technical is basically a superset of Visio 3.0. It employs the same easy-to-use system of grafting objects from a palette of shape outlines or *stencils*, and all 22 of the stencil palettes in Visio 3.0 are included. Also included is Shapeware's foolproof SmartShape technology that lets you resize, add, and connect shapes on the page.

But in addition to palettes



For Mortals:
Visio Technical 3.0 lets you add, move, and resize objects on precision drawings—without CAD.

for business graphics, Visio Technical includes shape sets for specialties such as electrical, mechanical, chemical, and petroleum engineering. There are palettes for space and home planning, plus network and software diagrams.

Visio Technical can read AutoCAD drawing (DWG) files directly, converting lines, blocks, and fonts into their

Visio equivalents. In effect, that means you can see and modify what a highly trained AutoCAD user creates. One limitation: Visio Technical does not export DWG files.

Given the \$149 street price of Visio 3.0, Visio Technical is pricey at \$249. Still, for technical professionals who don't want to get too technical, it's a perfect fit. **CHRIS O'MALLEY**

USABILITY: Design has never been so easy. *****

TECHNOLOGY: Not CAD-strength drawing, but very smart design and editing tools for real people. *****

VERDICT: A great bridge to cover the ground between the AutoCAD set and the rest of us. *****

FILEBOX

Visio Technical 3.0

Competition: IntelliDraw and SmartSketch offer drag-and-drop drawing, but only Visio Technical includes CAD smarts.

System Requirements: 4MB of RAM, 33MB of disk space (full installation).

\$249 est. street price
Shapeware Corp.
(800) 446-3335
Reader Service No. 642

Ray Dream Designer 3

3-D without a Degree

Ray Dream Designer certainly has a way of making fantasies look real, as many Mac artists can attest. Now Ray Dream brings its 3-D magic to the PC with Ray Dream Designer 3.

Named after the ray-tracing technique used to render images with the photorealistic nuances of lighting and shadows, Ray Dream Designer is a 3-D illustration tool that combines object modeling, scene composition, and final rendering in one program. Basically, it lets you create full-color still pictures that appear to have the depth, texture, and subtlety of real-world scenes.

Of course, recreating reality is no mean feat. Fortunately, there are a number of small usability touches in Ray Dream



Touch It: Ray Dream Designer 3's modeling tools let you create realistic 3-D graphics, such as a table with a wood-grain finish.

Designer that let even novices get in on the fun. The Modeling Wizard, for example, walks you through the basics of creating a 3-D object, and a Shaders Browser lets you apply colors and textures to your creations with drag-and-drop ease.

Ray Dream Designer is targeted mainly at professional

artists and graphics designers looking for ways to create spectacular 3-D effects. Complex images get, well, complex. And you'll need plenty of hardware muscle—ideally a fast 486 or Pentium system with accelerated video and 16MB of memory. But then, every dream has a price. **CHRIS O'MALLEY**

USABILITY: Very straightforward, as 3-D illustration goes. ****

TECHNOLOGY: Creates 3-D special effects under Windows, but the hardware overhead is hefty. ****

VERDICT: Not exactly 3-D for the masses, but getting close. ****

FILEBOX

Ray Dream Designer 3

Competition: Caligari's trueSpace offers the same 3-D features but adds more precision tools.

System Requirements: 486 or Pentium, 8MB of RAM, 28MB of disk space.

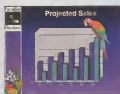
\$299 est. street price
Ray Dream
(800) 846-0111
Reader Service No. 643

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Harvard Graphics won just about every award as 2.0, and 3.0 is cleaning up as well.



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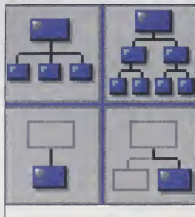
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Clear and Present Flowcharts

You're no artist; you're a businessperson with a mandate to define, visualize, and manage critical business procedures. What you need is an easy way to draw flowcharts and diagrams that communicate this complex information. Clear Software's allClear for Windows helps you do just that. And with Version III, allClear makes a giant leap in usability by letting you edit your creations in the speedy text outline view or in the slow but Wysiwyg graphical view.

AllClear III gives you finer control over output. You can still construct diagrams using the text editor, but allClear's Final Touch lets you move boxes in the graphical mode while maintaining data links.

If you work in a Lotus



Let It Flow: Put together an org chart in 30 minutes or less with allClear III for Windows. Sample flowcharts, box shapes, and drawing tools get you started.

Notes environment, allClear's Notes F/X integration lets workgroups share diagrams with all the views, editing capabilities, and other Notes benefits. Version III also includes an interactive Viewer: A chart created in allClear, for example,

can now become an object in any OLE client application.

If churning out flowcharts, process diagrams, and organizational charts based on complex information is your gig, allClear III for Windows deserves a good look. **RICH SCHWERIN**

USABILITY: Type in your org chart text and allClear handles the rest. ****

TECHNOLOGY: Smart new Notes integration, OLE 2.0 server capabilities; choose between graphical or speedier text mode. ****

VERDICT: Type it, chart it, e-mail it—flowcharts should always be so easy. ****

FILEBOX

allClear III for Windows

Competition:

Micrograph's ABC FlowCharter 4.0 and Shapeware's Visio 3.0.

Minimum System

Requirements: 386 CPU, Windows 3.1, 4MB of RAM, 4MB of available hard-disk space.

\$190 est. street price
Clear Software
(800) 338-1759, (617) 965-6755
Reader Service No. 644

ProdeaSynergy 2.1

Automate the Routine Tasks

You know the routine: Your boss wants the monthly sales figures. You have to pull numbers from three different spreadsheets, then dress them up in a presentation package. Enter a spreadsheet, get data; enter another spreadsheet, get data.

ProdeaSynergy 2.1 is a task automation package that you program to perform repetitive tasks. Actually, *program* isn't the right word—you don't write code, you drag icons and draw lines between them. Consolidating data from three databases into a word processor is as easy as dragging icons onto Synergy's Package window, drawing three lines, and setting ranges in the worksheets. Synergy consolidates all your numbers with the click of a button.



Play It Again: Need an electronic office assistant to automate tasks? Make ProdeaSynergy do it for you.

We found it simple to automate typical tasks, such as pulling totals from several employees' travel and expense worksheets.

Synergy's one problem: It doesn't handle errors well. If you run out of memory or an

application doesn't start, Synergy will generate the wrong result or simply freeze.

ProdeaSynergy is a great way to automate tasks. Now, if we could only get it to write reviews. **JOHN MONTGOMERY**

USABILITY: Setting up applications to pipe data into Synergy can be difficult initially. **

TECHNOLOGY: Supports DDE, OLE 2.0 automation, and most Windows apps. ****

VERDICT: Automate anything you find repetitive, without writing code. ****

FILEBOX

ProdeaSynergy 2.1

Features: Scheduling agents, GUI prompts for mapping tasks visually, and a configurable interface.

Compatibility: Supports most Windows apps.

\$295 est. street price for single user, \$2495 for ten users
Prodea Software Corp.
(800) 427-2317
Reader Service No. 645

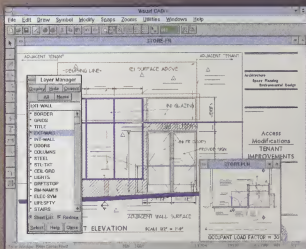
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Circle 284 on reader service card.

Window Dressing for an Aging OS

With all the hoopla over Windows 95, it's hard to imagine why any company would still develop an upgrade to DOS. After all, the future is clearly in graphical 32-bit operating systems. DOS as we know it is on its last legs. But while Microsoft has quietly put MS-DOS on the back burner, IBM has made some incremental improvements to the aging OS.

The majority of the features in the new PC DOS 7 are available as separate utilities, but there's something to be said for having them within the OS, particularly if you're a notebook user. Enhanced PC Card and docking station support (for Plug-and-Play systems) and new power management features make this DOS a desirable upgrade for portable PCs.



Toss the Manual: IBM's PC DOS 7 includes an intuitive, searchable online reference infobase so you can toss those bulky user manuals.

IBM has discontinued the SuperStor/DS disk compression program (which it owns), and is instead bundling Stacker 4.0 with PC DOS 7. Converting a DoubleSpace volume to a Stacker volume is effortless. The Windows front end makes it easy to defragment and change the compression ratio. As for editing, when we last reviewed

for multiple-file edits. In addition, a subset of REXX, the enhanced batch-file programming language of OS/2 fame, is now available in PC DOS.

Should you upgrade to PC DOS 7? If you're a notebook user or if your current DOS is MS-DOS 5 or older, the answer is an emphatic yes. Other users need not rush.

PC DOS ("DOS and DOS: Separated at Birth," July 1994, page 94) we had complaints about its rudimentary text editor, E. Well, E now supports pull-down menus and a split-screen mode designed

Yael Li-Ron

USABILITY: Improved over earlier versions, but it's still DOS. ***

TECHNOLOGY: Incremental improvements to the aging operating system. ***

VERDICT: A worthwhile upgrade for DOS 5.0 and notebook users; everyone else should wait for Windows 95. ***

FILEBOX

PC DOS 7

Competition: MS-DOS 6.22.

Minimum System Requirements: 512K of RAM, 3MB of available hard-disk space.

Utilities: Stacker 4.0, RAMBoost, AntiVirus, Backup, Scheduler, Dymalode (for loading device drivers on the fly).

549 est. street price
IBM
(800) 426-2255
Reader Service No. 646

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Circle 148 on reader service card.

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PRICE	\$129	\$129	\$129	PRICE	\$259	\$259	\$259
Price per Watt	.72	.81	.79	Price per Watt	.80	1.13	1.00
Auto Shutdown	YES	YES	NO	Auto Shutdown	YES	YES	YES
Test Battery	YES	0	3	Test Battery	YES	YES	YES
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Site Wiring Fault Indicator	YES	NO	NO	Site Wiring Fault Indicator	YES	YES	YES





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August 1994
TM4000M/25

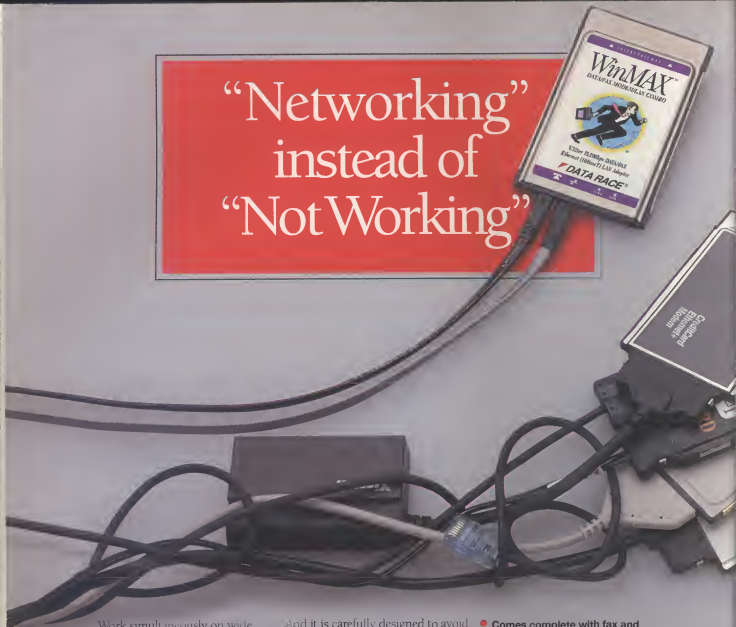


July 1994

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Circle 163 on reader service card.

"Networking" instead of "Not Working"



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New! NETWORKING:

MultiCard vs. CreditCard Ethernet+Modem II

LanRover/Plus 3.0

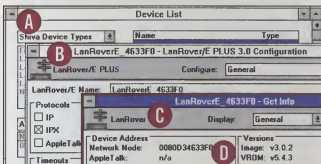
Remote LAN Access on Steroids

If there's one word that comes to mind when we think of remote LAN access, it's *slow*. Current access servers based on V.32 or V.32bis modulation make remotely checking e-mail or exchanging files painful and time-consuming. Ideally you need more raw connection speed, and that's what Shiva's LanRover/Plus 3.0 communications server provides.

With the addition of V.34 modems to its LanRover/Plus/E (Ethernet) and LanRover/Plus/T (Token Ring) access servers, Shiva has taken its tried-and-true technology to a new level, providing 115Kbps throughput to road warriors and network administrators alike. No other solution offers as much remote-access bandwidth at such a low price.

Step on It Shiva couples V.34 support with a flexible array of network interface options. Now you can cut your remote connect time in half with faster network response and speedy data transfers.

We also found the LanRover/Plus exceptionally easy to manage thanks to Shiva's well-designed Net Manager software. From a single Windows desktop we could configure and control all of the Shiva dial-up products on our mixed NetWare/Windows NT test network. These included both a LanRover/Plus/E access server and another of Shiva's popular dial-up products, the NetModem/E. Software setup was a seamless, point-and-click affair, with the Net Manager application providing a centralized administration interface for the entire configuration.



Point-and-Click Affair: Shiva's Net Manager application makes managing your LanRover/Plus 3.0 remote-access server a simple point-and-click process. Net Manager also supports Shiva's NetModem products.

Fast Remote: Equipped with integrated V.34 modems, you can put the LanRover/Plus 3.0 to work as a high-speed, remote-access server for a roving sales force or as a LAN-to-LAN router. It's available in either Token Ring or Ethernet models.



Great throughput, easy to manage—what else could you want in a remote-access server? How about automatic protocol adjustment? LanRover/Plus detects the network protocol in use by dial-up clients and adapts instantaneously. Supported protocols include IPX, IP, NetBEUI, LLC 802.2, and AppleTalk Remote Access 2.0 (LanRover/Plus version only).

The Extras Other goodies include shared dial-out capabilities with modem pooling, dial-up LAN-to-LAN routing for WAN applications, and seamless integration with Novell's NetWare bindery. This last feature makes managing the LanRover/Plus in a NetWare

environment even easier since you have to maintain only a single-user account database (the bindery). LanRover/Plus then uses this database when validating dial-up users.

As mentioned, LanRover/Plus comes in two flavors: LanRover/Plus/E for Ethernet networks and LanRover/Plus/T for Token Ring networks. Both are rack-mountable and come configured with either four or eight V.34 modems.

Overall, the LanRover/Plus 3.0 is a winner. Its combination of top-end performance, ease of use, and innovative technology put it a step ahead of the other remote-access servers on the market. **RANDALL C. KENNEDY**

USABILITY: Easy installation and configuration, well-designed interface. ****½

PERFORMANCE: High-speed V.34 modems yield twice the performance of V.32 and V.32bis. ****

TECHNOLOGY: Detects and adjusts to different network protocols. *****

VERDICT: Sleek interface and raw performance make it a great deal. ****½

A. The Device List window lets you select from the different Shiva dial-up products on your network.

B. The Configuration window provides complete access to all LanRover/Plus functions.

C. The Get Info window shows a variety of operational statistics.

D. The Device Address area of the Get Info window shows the protocol in use and adjusts settings automatically.

FILEBOX

LanRover/Plus 3.0

Competition: NetWare's NetWare Access Services and Microsoft's Remote Access Services.

System Requirements: 386 or faster CPU, Windows 3.1 or later in Enhanced Mode.

From \$6,499 est. street price (four modems) to \$8,899 (eight modems) for LanRover/Plus/E; from \$7,499 est. street price (four modems) to \$8,899 (eight modems) for LanRover/Plus/T
Shiva Corp.
(800) 458-3550, (617) 270-8300
Reader Service No. 647

Guide to the Ratings: ***** Excellent **** Good *** Acceptable ** Poor * Unacceptable

Double-Dealing PC Cards

When you were a kid, did you ever have contests to see who could stuff the most marshmallows in his or her mouth? Okay, maybe you didn't, but pretend you did. The secret was to take two marshmallows and crush them together. You could easily double the number in your mouth this way.

Now look at your notebook's PC Card slots. Wish you could stuff more PC Cards into them? If you're on a network and need to use a modem, you have to go through the hassle of unplugging the disk drive to dial out. What you need is a way to crush your Ethernet card and modem together.

This is exactly what two companies—Apex Data and Xircom—have done. For about the same price as separate fax modem and Ethernet PC Cards, you can free up one of your system's PC Card slots and have simultaneous access to your network and to your modem.

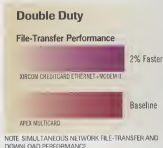
At first glance, Apex's MultiCard and Xircom's CreditCard Ethernet+Modem II are very similar. On the network side, they both support NetWare, Windows NT, Workgroups, LANtastic, and most of the popular TCP/IP stacks. Both also support either 10Base-T or 10Base2 wiring standards. The main difference between these cards is price. The MultiCard will set you back about \$549, while the CreditCard costs about \$799.

Calling Cards On the modem side, both support the popular V.32bis, V.42, and V.42bis standards, as well as the Hayes AT modem command set. In addition, the CreditCard offers a nice extra that the MultiCard doesn't: support for the V.32terbo standard, which lets it hit data trans-



Save a Slot: One PC Card slot and two requirements? Try Apex's MultiCard (left) or Xircom's CreditCard Ethernet+Modem II (right). Either gives you a combination fax modem and Ethernet hookup. The MultiCard uses fixed-length connectors to connect to a phone or Ethernet port, while the CreditCard has ponytails that can accommodate any length you want.

Transfer Twins: Performance was about the same for these two network/modem PC Cards when transferring network data and downloading files from a BBS.



sion speeds of up to 19.2Kbps.

We tested both modems in a variety of machines, and the results were interesting. The MultiCard manual and installation procedure warn that the card doesn't support any card-and-socket services and isn't hot-swappable. This means that you can't simply slip the MultiCard into a slot on a machine that's running; you have to shut the power off, plug in the card, and restart. The CreditCard has its own idiosyncrasies: We had to go through the setup procedure twice to get the card to attach to our particular NT network server.

As for our Ethernet performance tests, both cards were able to sustain between 3Mbps and 4Mbps throughput, which is about the limit of the PC Card bus. The modem performance of both cards was also similar.

Side by Side The MultiCard costs about \$250 less than the CreditCard, but you lose card-and-socket services and therefore some PC Card functions. In addition, the CreditCard offers a cellular phone attachment that turns it into a cellular modem. Both are excellent choices, but the CreditCard promises more mileage. **JOHN MONTGOMERY**

MultiCard

USABILITY: Not hot-swappable, but installation is straightforward. ****

TECHNOLOGY: Supports the major network and modem standards. ****

VERDICT: Low price, but lacks support for card-and-socket services. ***½

CreditCard

USABILITY: Easy to install and configure, connector length is variable. ****

TECHNOLOGY: Enviably cellular option for mobile execs. ****½

VERDICT: A little more expensive, but socket services and V.32terbo make it worth it. ****

FILEBOX

MultiCard

Network Features: Includes support for NetWare, Windows for Workgroups, Windows NT, LANtastic, and most TCP/IP stacks.

Modem Features: V.42, V.42bis, and V.32.

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Logbook

LONG-TERM TESTS:

Multimedia Stacker • Xerox 4900 Color Laser



Coping with Overload

There are two schools of thought for computer use. One says that if your PC runs without any glitches, leave it alone. The other school says that you should push your PC as hard, fast, and far as you can. In other words, show it who's boss.

The first attitude makes sense. PCs are such cantankerous contraptions that it's best to leave well enough alone. But pushing your PC is where the fun is. And sometimes you don't get burned.

Multimedia Stacker (which includes Stacker 4.0 and Multimedia Cloaking) is a case in point. I've used Stacker since Version 1.0, and it's scrambled my files only once (I recovered most of them with the aid of Stac Electronics' tech support). During that same time, I've lost four hard drives to power problems, circuit board snafus, or

old age, and I've lost countless files to buggy applications or my own carelessness.

I've tried other disk compression utilities, but Stacker remains my favorite for its performance and security. When I installed Stacker 4.0, it was over a Stacker 3.1 installation, which was managing drives compressed with Microsoft's DoubleSpace. Each time I had booted the PC prior to that, Stacker 3.1 had begged me to let it convert the DoubleSpace drives to Stacker drives. I should have taken its advice. Stacker 4.0 automatically converted the DoubleSpace drives when it was installed, and the result was 106MB of additional storage. And that was with Stacker set for maximum speed rather than maximum compression.

In other words, Stacker is safe and effective. The same goes for Multimedia Cloaking. But if Stac Electronics sells both in the same box, the programs should be aware of each other. You shouldn't have to fiddle with CONFIG.SYS settings to stop conflicts. Those are the annoyances that put smug smiles on the faces of people who never try to improve their PCs.

RON WHITE

Multimedia Stacker / Stac Electronics /
(800) 522-7822, (619) 794-4300 / \$99 est. street price /
Reader Service No. 69

Logbook Entries:

October 10, 1994: *Installation is a breeze, except that Stacker 4.0 doesn't automatically add its utilities to Windows. Tech support tells me I have to run a program called SGROUP.EXE.*

November 25, 1994: *I finally install Multimedia Cloaking, but now Windows won't run. Stacker and Multimedia Cloaking both install a special driver that lets them use the processor's protected mode. The solution is to tell Multimedia Cloaking to keep its hands off.*

January 15, 1995: *I install Helix's \$99 NetRoom memory manager—not included with Multimedia Stacker. It buys me another 69K of conventional RAM.*

February 28, 1995: *None of the programs balk at NetRoom's cloaking replacements for the multimedia drivers.*

Logbook Entries:

June 20, 1994: *Wow, this is one big printer. After two people lug the Xerox 4900 Color Laser into my office, it takes me only a few minutes to start printing documents chock full of color.*

December 28, 1994: *It's been around the block now, participating in several reviews and photo shoots. Now I'm getting a bogus error message about the top cover being open when it's not.*

January 3, 1995: *Aha! It's not the top cover after all. The magenta toner cartridge wasn't inserted as far as it could go. Simple solution, funky error message, but I'm printing again!*



Living with a Color Laser

Life would be a dream if everyone had a color laser printer sitting in their office. Having color copies of my documents sure makes them stand out among the other editors' output.

The only tough adjustment to make if you have a color laser sitting nearby is the smell. If I work with my office door closed and invite a neighbor in for a chat, the smell of burning crayons overwhelms the senses. Then again, maybe some people like that.

The more I use the Xerox 4900 Color Laser, however, the more I realize that for straight black text printing I prefer the output quality of our older black-and-white network laser printer down the hall. The Xerox 4900's black text has a fuzzy quality to it, which can be distracting in text-heavy documents. I have the same problem with colored text.

Color graphics, on the other hand, look sharp. The 1,200-by-300-dpi resolution makes computer interface printouts look almost as good as they do on my monitor—except for a slight registration problem with white text on a dark background.

Using the Power Saver option, the Xerox 4900 sits quietly and idly while I work on my stories. It doesn't jump to attention as quickly as I'd like when I activate it to print, but I have yet to find a printer that does.

KYLA K. CARLSON

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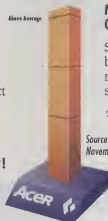
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SYNOPSIS

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FINAL ANALYSIS: Pick the perfect system for your needs using PC Computing's Decision Maker. Systems from Tagram, MidWest Micro, and Zeos top our list. **128**

REALITY BYTES: Never fast enough. **130**

Waiting for a computer is a nuisance. We know they're supposed to save time, perform repetitive chores, and all that good stuff. But sometimes they get in the way. Sometimes it's just faster to do it by hand. For instance, you write a letter, but then don't run a spelling checker because it takes too long.

Or you keep your contact information in a Rolodex instead of a personal information manager because finding names on paper is faster. What aren't you doing with your computer because it's too slow?

More important, what haven't you even considered doing with your computer? Could you use document management software and optical character recognition to remove the piles of paper from your office? What about some kind of groupware application to make you more productive? How about playing with multimedia to see how it can benefit your business?

In order to unleash the power of technology, you need more speed. Yes, we always seem to say that, and yes, it's obviously not the complete solution. But it's part of the solution, and a part that you can have today. So get a faster computer. Heck, get the fastest you can—a 100MHz Pentium-based system. Think it's too expensive? Think again. The average price for systems in this review hovered right around \$4,000.

Three Blind Myths That's right, prices on superfast systems are where you need to justify why you *didn't* get one. And it's a myth that the fastest system always costs too much. The fastest we tested, Tagram System's Thunderbolt, costs only \$3,449 loaded with the extras we requested. Given that you could pay over \$3,000 for a similarly configured 486-based system, get the power.

That's not to say that all 100MHz Pentium-based systems are great bargains—some of the slowest systems we tested had over \$4,000 price tags. But if you shop wisely, you'll get massive performance for corporate spare change.

Let's kill a second myth, the one that claims all systems with a

A BIG IRON: These are not small systems—all but one of them came in an under-desk tower configuration.

B THE HEART: Inside each system we reviewed is this friendly chip—a 100MHz Pentium.

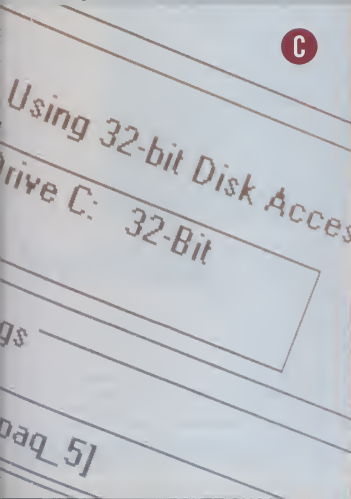
C THE MYTH: But CPU speed isn't everything. We saw 90MHz Pentiums beat 100MHz systems easily thanks to Windows' 32-bit disk access.

D THE WINNER: Big iron is expensive, right? Not necessarily. The fastest system we tested, Tagram's Thunderbolt, was also the least costly: \$3,449.

BY JOHN MONTGOMERY



Empowerment: A 100MHz Pentium system lets you exploit your software.



Frustration Factor: Can You Stand to Wait for Your PC?

particular CPU (for example, a 100MHz Pentium) perform roughly the same. Look at the performance results for the systems we tested (see "Do You Really Need All of That Speed?" below). All but two of the systems had a 100MHz Pentium processor. All but three were built around an Intel-designed motherboard. Still, you can see the tremendous performance range. Not all systems are created equal.

This leads to our third (and final) myth: A faster CPU guarantees a faster computer. No way, not even close. Look again at the performance results below. Two of the systems had 90MHz Pentium CPUs. One of them outperformed all but three of the other systems. The other 90MHz Pentium PC outperformed two systems with a 100MHz CPU.

Power Level Does every application require a 100MHz Pentium? No way. If you only send simple e-mail, you can get by with a much slower system. Heck, you probably are. But if you want to use a rules-based e-mail package that brings important messages to your attention while filing away silly memos, you'll want more power.

Will every application benefit from a 100MHz Pentium? If the system's the same, yes. During our tests, we saw a uniform improvement in performance from a 90MHz Pentium to a 100MHz Pentium. Word processors, databases, spreadsheets, and graphics packages will each experience about a 7 percent boost.

Are there applications that *require* a 100MHz Pentium? Yes and no. You can do just about anything on slower systems, but there comes a point where the

PICKS THE 100MHz EDGE

1 What kind of apps do you run?	2 What best describes your needs?	3 Minimum configuration for a new system is...
Business	Word Processing	66MHz 486, 8MB of RAM
	Spreadsheets	100MHz 486, 16MB of RAM
Graphics	Photo Editing	100MHz Pentium, 32MB of RAM
	Drawing	75MHz Pentium, 16MB of RAM
Network	File Server	66MHz 486, 16MB of RAM
	Application Server	90MHz Pentium, 32MB of RAM

frustration factor from waiting is so great that you feel it's just not worth it. Anybody who has ever tried to use photo-editing software or a CAD package knows that. So do people with large spreadsheet models and database queries. The 100MHz Pentium can alter the way you work by letting you run your models and queries more often, so you have more up-to-date information. And we all know that information is another word for power.

The Bottom Line If your budget's tight and your needs are modest, you could get by with less than a 100MHz Pentium-based system. But we found three—from Tagram System, MidWest Micro, and Zeos International—that will let you fully harness the power in your software for a very reasonable price.

COUNTERPOINT

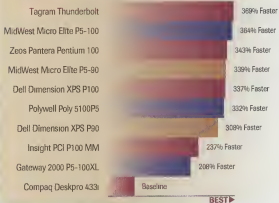
DO YOU REALLY NEED ALL OF THAT SPEED?

All the systems in this review were similarly configured (16MB of RAM, a 1GB disk, and so on), but two pairs of them were *identical* except for processor speed: MidWest Micro's Elite systems and Dell's Dimension XPS systems. With paired systems we were able to answer the question, "How much difference *does* the processor make?"

The answer: quite a bit. On average, the raw Winstone numbers went up about ten points. Put in relative terms, the 100MHz systems were about 7 percent faster. Why not 11 percent? After all, going from 90MHz to 100MHz is an 11 percent speed increase. In a benchmark testing only CPU performance, you *would* see an 11 percent gain. But in day-to-day operations, we use more than just the CPU. Video cards, disk drives, RAM, and the system bus come into play. Winstone measures the performance of actual applications like Microsoft Word for Windows performing actual operations—just the way you work. So while the CPU is 11 percent faster, the other components hold the full potential of the CPU speed boost in check.

Standing Strong What's more interesting is how well 90MHz systems fared against 100MHz systems overall. One—MidWest Micro's Elite P5-90—had the fourth-highest Winstone score of the systems we tested. Plus, it's

Performance: Winstone



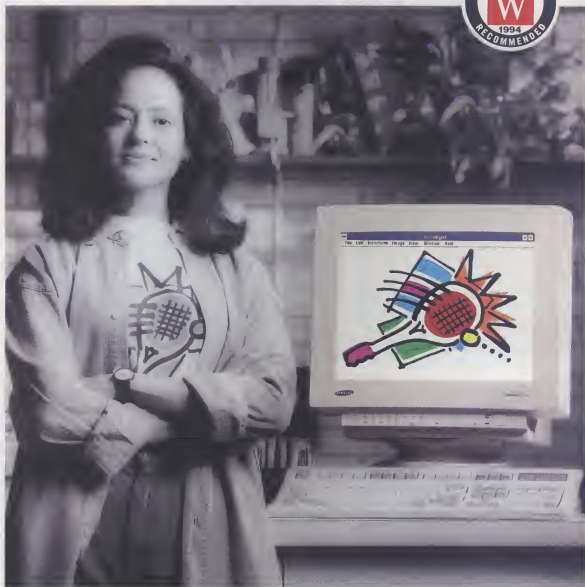
NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS.

It's Enough: A 90MHz system can equal or better the performance of a 100MHz Pentium—sometimes for less.

only \$3,699, which makes it one of the least expensive.

There's a happy ending to this story: The top-scoring system—Tagram's Thunderbolt—was also least expensive (\$3,449). Sometimes you *can* have your cake and eat it too.

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Fast-Save Screen	•	•	•	•
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Quiet Thunder



USABILITY: *So-so case,*

*keyboard.****

PERFORMANCE: *Noticeably faster.******

TECHNOLOGY: *Who needs four PCI slots?******

VERDICT: *The system to beat.******

FILEBOX

Thunderbolt

Pros: High performance, ultralow price.

Cons: Only four ISA slots—ideally we'd like to see one more.

Suitability: This system seems to have everything we'd possibly want in a high-end desktop.

\$3,448 list as tested
Tagram System
(800) 824-7267, (714) 258-3222
Reader Service No. 661



It's sitting discreetly on the test bench, quiet and humble. You'd never guess from looking at it that Tagram's Thunderbolt is fast. In fact, it's the fastest system we benchmarked for this review. It's also the least expensive. Give us \$3,449, and we'd rush out and buy one.

Inconspicuous What makes the Thunderbolt so innocuous? Its desktop enclosure. It was the only system we tested that wasn't a tower. It was also one of only three systems *not* using the Intel motherboard. That explains why it has four ISA slots and four PCI slots, instead of the usual five/three mix.

Fitting 16MB of RAM, a 1GB Micropolis MC4110 disk drive, a Diamond Stealth 64 video card with 2MB

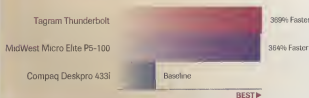
of VRAM, a Sound Blaster 16 sound card from Creative Labs, and the quad-speed Teac CD-ROM drive into this enclosure is a bit of a stretch. It's not that the case is too small—in fact, it measures about the same as Dell's Dimension XPS P100. But the placement of the Thunderbolt's power supply wastes space. Like the Dimension XPS P100, it has three full-sized external drive bays (capable of holding a CD-ROM drive) and two internal bays (one is a half-height). Another similarity with the Dimension XPS P100 is that one of the drive bays obscures the SIMM sockets, so any RAM upgrades will require some agility with a screwdriver.

The Thunderbolt isn't perfect, though: Its custom-designed motherboard has fewer ISA slots than we'd like. Given the preponderance of ISA cards compared to PCI cards, you'd think that Tagram would have taken the space for one PCI slot and made it an ISA slot. Also, we found the keyboard's feel loose and klunky, and there were no applications bundled with the unit.

Raw Speed But performance is what the Thunderbolt is all about, with 512K of secondary cache (twice that of most of the other systems) and a fast drive from Micropolis. Is it *that* much faster than its closest competitor, MidWest Micro's Elite P5-100? No, but these two systems are noticeably faster than Zeos's third-place Pantera Pentium 100.

Once in a while there is a harmonic convergence between performance and price. We pray for such moments. The Thunderbolt answered our prayers.

Performance: Windows Apps



NOTE: WINSTONE 95 RANKS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Zooooom! OK, it's fast—the fastest system we've tested yet. OK, it's inexpensive—\$450 less than MidWest Micro's Elite P5-100. OK, I want to know where I can get one!

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Circle 109 on reader service card.

Package Deal



USABILITY: *Poor design, nice keyboard. *****
PERFORMANCE: *One step from winning. *****
TECHNOLOGY: *Great ergonomics. ****
VERDICT: *A top contender. *****

FILEBOX

Elite P5-100 Office PC

Pros: It's darn fast and darn cheap.

Cons: It's also just too darn big (darn).

Suitability: Open the box and start computing with its bundled software—a well-done package.

\$3,899 list as tested
 MidWest Micro
 (800) 728-8582, (513) 368-2309
 Reader Service No. 662

What's bigger than a bread box? A lot bigger? OK, you guessed. It's MidWest Micro's Elite P5-100. It was named the Office PC for good reason: You can set up a small office inside this high-performance machine.

Aside from size, what do you get with this behemoth? Well, we configured ours with 16MB of RAM, a 17-inch monitor from InfoTel, a 1GB IBM IDE disk drive, ATI Technologies' Mach 64 PCI video card with 2MB of VRAM, a 14.4Kbps internal modem from InfoTel, and Aztech's Sound Galaxy 16 Basic sound card that controlled Panasonic's dual-speed CR-562B CD-ROM drive. (A MidWest Micro official told us that the Elite P5-100 would ship with a quad-speed CD-ROM drive from NEC

Technologies by the time you read this—but happily the system's price would remain the same.)

Outside the box there were some nice surprises too. Most noticeable was Microsoft's Natural Keyboard included with the standard package. The ergonomic Natural Keyboard is fairly comfortable, with a slightly mushy feel that you'll either love or hate. But once you adjust to the hand position it requires, you may have problems going back to a standard keyboard.

Design Flaws The overwhelming size of the Elite P5-100's enclosure might imply a spacious interior. But once you wrestle the cover off, you'll see that somebody goofed with the design. For example, if you want to get to all four SIMM banks, you have to remove the cage holding the internal drive bays. And if you want to pull out the internal modem or sound card, you have to unplug some unlabeled ribbon cables first—then guess about where they go when you try to plug them back in.

Beyond that, the parallel port sits squarely in front of one of the ISA slots, blocking it from use.

Performance Pros Overall, though, these complaints about design are not going to bother most of us. The Elite P5-100's high performance—second only to Targem's Thunderbolt—more than compensates for them. That, plus a well-chosen software bundle (Microsoft Office Pro, Bookshelf '94, and Encarta '95) and promising price (only \$3,899), send the Elite P5-100 near the top for honors.

Performance: Windows Apps



NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

So Close: We were impressed with the Elite P5-100's performance in all of our benchmarks, and its price was the third-lowest of the systems we tested.

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PC, Texas Style



USABILITY: *Big but*

*good. *****

PERFORMANCE:

*Impressive. *****

TECHNOLOGY: *Great*

*sound. *****

VERDICT: *A definite*

*winner. ****

FILEBOX

Pantera Pentium 100

Pros: Great expandability; good performance, price.

Cons: Large enclosure.

Suitability: With high performance and a low price, this is the kind of high-end system we should all have.

\$3,795 list as tested
Zeos Int'l.
(800) 554-5218, (612) 362-1234
Reader Service No. 663

Zeos's Pantera Pentium 100: big name, big box, big performance—and a rating consistently in the top three in our various tests. Not everything about this system is big, however: Its price is actually the second lowest, just \$3,795.

So, what did we put into the big box? What you'd expect: 16MB of RAM, a 1GB hard disk from Seagate, a 17-inch monitor, three PCI slots, five ISA slots, a Turtle Beach Systems' MonteCarlo 16-bit sound card, a quad-speed CD-ROM drive from Mitsumi, and a Diamond Stealth 64 video card with 2MB of VRAM.

What's Hot That's quite an impressive list of specs. Take the sound card, for example. The Pantera Pentium 100 includes Turtle Beach's MonteCarlo,

which consistently wins our jury tests for best sound quality. Or look at those bus slots: You don't have to share any of them, unlike with most of the other systems we evaluated.

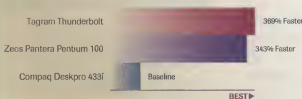
There are six SIMM slots capable of holding up to 192MB of RAM. The other systems (except Polywell's Poly 5100P5) hold only 128MB. And check out all those drive bays: five internal bays for hard disks and four external drive bays. Best of all, the space inside the box is well laid out: You don't have to remove anything to add RAM, none of the bus slots are blocked, and you can just pop out the CPU whenever you want.

The coolest expansion possibility is an empty socket that can be filled with either a LAN adapter or a SCSI host adapter chip.

Really Fast This system is a zippy performer. In WinBench 95, our benchmark of component-level performance under Windows, the Pantera Pentium 100 had the best graphics performance after the Dell Dimension XPS P100. In Winstone, which measures the performance of actual applications under Windows, the Pantera was about 20 percent slower than Tagram's Thunderbolt and MidWest Micro's Elite P5-100.

The \$3,795 price tag is very reasonable compared to the other systems—about \$350 more than the incredible Thunderbolt and \$104 less than the Elite P5-100. This is definitely one of the top systems you should consider when you open the corporate coffers for the purchase of a high-end system.

Performance: Windows Apps



NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Good Speed: Zeos's Pantera Pentium 100 is a fast system, bested only by MidWest Micro's Elite P5-100 and Tagram's Thunderbolt on Winstone 95, and the price is reasonable.

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USABILITY: A superb use of space. ****

PERFORMANCE: Beaten by a 90MHz PC. ***

TECHNOLOGY: Cool 128-bit graphics. ****

VERDICT: A good but not great system. ***

FILEBOX

Dimension XPS P100

Pros: Small form factor will fit most anywhere.

Cons: Performance wasn't bad, but it wasn't terrific.

Suitability: For a top-speed system, we'd want a bit more speed.

\$4,099 list as tested
Dell Computer
(800) 613-3355, (512) 338-4400
Reader Service No. 664

On the outside it's cute, undeniably cute, especially next to all the other hulking behemoths we tested. In fact, it looks less like a minitower than a standard desktop enclosure turned on its side.

Look inside Dell's Dimension XPS P100, and you'll feel like you're peering into a cramped, dingy cave. That's what happens when you configure the system as we did: 16MB of RAM, Western Digital's 1GB Caviar AC31000 disk drive, a Sound Blaster 16 card, Number Nine's Imagine-128 video card with 4MB of VRAM, and a dual-speed Sony Electronics CD-ROM drive.

Good Things, Small Packages This system has only three full-sized drive bays (external bays capable of accepting a CD-ROM drive, for example)

and two internal bays (one full-height, one half-height). And one of the internal bays partially obscures one of the four SIMM sockets, so you'd probably have to remove that before doing a serious excavation inside your computer.

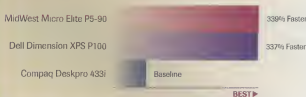
Despite its small size (and unlike many of the larger systems we examined), the Dimension XPS P100 gives you full access to all your ISA and PCI bus slots. Only two are filled (with sound and video cards), so you have four ISA slots (one shared) and two PCI slots (one shared) free. It seems the only feature Dell has given up with this minitower design is a few extra drive bays.

The case design is a mixed bag: First, it uses no screws—just one thumbscrew stands between you and an open case. That's good. The power switch, however, is a bit hard to press, and you'll need a pen to press the reset button.

No Speeding The overall performance of the Dimension XPS P100 wasn't terrific, but it wasn't bad. On Winstone, we were surprised that it somehow scored below MidWest Micro's 90MHz Elite P5-90, but only by a hair. We attribute that to somewhat slow performance of the disk drive.

Overall, the Dimension XPS P100 is a fine system, but in the company of the other systems in this review, it was a bit disappointing. For \$4,099 we expected either a better software bundle or faster performance. For \$650 less you can get Targem's Thunderbolt, which is considerably faster.

Performance: Windows Apps



NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

My 2 Percent Worth: A 100MHz Pentium beaten by a 90MHz Pentium? Something seems wrong. The answer lies in disk performance, which was not up to snuff.

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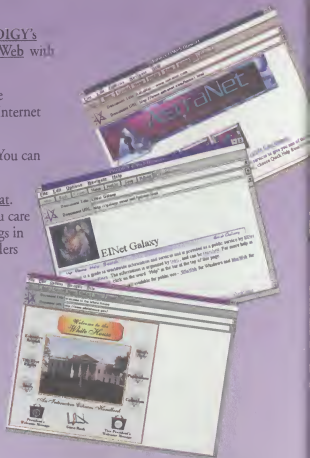
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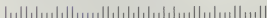
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Poly Saturated



USABILITY: *Poor design, mushy keyboard. ***

PERFORMANCE: *Beat by two 90MHz PCs. ****

TECHNOLOGY: *Caching controller. *****

VERDICT: *There are better buys. ****

FILEBOX

Poly 5100P5

Pros: Fairly small enclosure for a 100MHz Pentium.

Cons: Performance seems sluggish next to other 100MHz Pentiums.

Suitability: For a top-speed system, we'd want a bit more speed.

\$4,395 list as tested
Polywell Computers
(800) 999-1278, (415) 563-7222
Reader Service No. 665

Polywell's Poly 5100P5 is unexceptional for a \$4,395 100MHz Pentium-based computer. Its performance is somewhat lackluster (again, for a 100MHz Pentium), and its price is higher than all of the other systems reviewed. Even the case design is just fair.

What's Inside The Poly 5100P5 we tested had 16MB of RAM (expandable to a remarkable 768MB), Western Digital's 1GB Caviar AC31000 disk drive connected to Tekram's caching PCI disk controller with 4MB of cache, a Sound Blaster 16 sound card that controls Teac's quad-speed CD-ROM drive, and a Diamond Stealth 64 video card with 2MB of VRAM.

It also has four PCI slots and four ISA slots, but don't bank on using all of them. The serial-port card

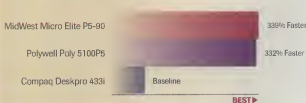
occupies one ISA slot, two of the ports occupy another, and the caching disk controller occupies one PCI slot. So in reality, the system has two ISA slots and three PCI slots. One of each is occupied by the standard equipment (sound and video cards). This minitower's expansion drive bays are decent, with five external bays (three of which are full size, two of which are half-width) and three internal bays.

The inside of the case is a morass of cables. There are power cables that drop down from the power supply, block access to the SIMM banks, and plug into the motherboard and the disk drive, and there are ribbon cables that run from various option boards all over the inside of the computer. Close your eyes if you're light of heart. It's not a pretty sight.

Performance Polywell Computers' systems usually do exceptionally well in our benchmarks. This time, however, the Poly 5100P5 was bettered by several systems, including MidWest Micro's 90MHz Pentium Elite P5-90. We figured that with the large cache on the disk controller the Poly 5100P5 would win all the disk benchmarks, and it did under DOS. But under Windows, the disk performance was simply reasonable—not as exceptional as we expected.

The price for this system? It's the most expensive we tested at \$4,395. For as much as \$1,000 less, you could get a better system. Although the Poly 5100P5 has strong components, it does not compare well to its impressive competition.

Performance: Windows Apps



NOTE: WINSTONE 95 FILMS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

90MHz Blues: The Poly 5100P5 is one of four 100MHz Pentium-based PCs bested by MidWest Micro's 90MHz Elite P5-90. CPU speed clearly isn't everything.

32-Bit Part



USABILITY: *Poor internal design. ***

PERFORMANCE: *Beaten by two 90MHz PCs. **

TECHNOLOGY: *Quad-speed CD-ROM. ****

VERDICT: *Better systems are to be found. ***

FILEBOX

PCI P100 MM

Pros: Quad-speed CD-ROM drive is standard.

Cons: Poor case layout and mediocre overall performance.

Suitability: The multimedia components in the system are good, but performance is poor.

\$4,249 list vs. tested
Insight Direct
(800) 755-3875, (602) 902-1176
Reader Service No. 666

Remember the game, "One of these things is just like the other"? Looking at the case of Insight Direct's PCI P100 MM, we thought, "Hmmm, looks familiar." When we opened it, we realized why: The case and motherboard were identical to that in MidWest Micro's Elite P5-100. The performance and price, however, were different: lower and higher, respectively.

Same but Different Since the PCI P100 MM has the same design as the Elite P5-100, we have the same complaint about the design: It's a huge tower with a horrible internal layout. You have to remove the internal drive bay case in order to get at the SIMMs. Also, the parallel and serial ports are installed in such a way that you can't install boards in two of the ISA slots—a

serious problem considering that there are only five ISA slots and three PCI slots, one of which is shared.

So what's included in the \$4,249 price tag? Imagine 16MB of RAM and Western Digital's Caviar AC31000 hard disk. Now add a Teac quad-speed CD-ROM drive running off a Diamond Sonic Sound LX 16-bit sound card. Tuck in a Diamond Stealth 64 PCI video card with 2MB of VRAM, and you have a nice system. Finally, surround it with a 17-inch monitor from Mag InnoVision and some mediocre speakers from Diamond Multimedia Systems.

Run the Numbers Now imagine that system with great performance. Well, your imagination must be pretty good: The PCI P100 MM's performance overall was near the bottom of our list, below even the two 90MHz Pentium systems. Why was it so poor? The system we received had no 32-bit disk driver, so we couldn't turn on 32-bit disk access in Windows for Workgroups. In our DOS benchmarks, where the lack of a 32-bit disk driver isn't important, the PCI P100 MM performed well. Insight officials have said that by press time a 32-bit disk driver will be standard equipment. If Insight starts shipping a working 32-bit disk driver with this system, expect very good performance on a par with the MidWest Micro Elite P5-100.

If you want a monster of this size under your desk, however, MidWest Micro's Elite P5-100 offers a better deal with a 14.4Kbps internal modem, higher performance, and a lower price (only \$3,899).

Performance: Windows Apps



NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Bad Disk: Without a 32-bit disk driver, the PCI P100 MM fell flat. Insight officials say that our system was a prototype and that production systems will ship with one.

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PerfectOffice is so automatic, it even corrects spelling errors as you type. We know, so does Microsoft



	PerfectOffice 3.0 Standard Edition	Microsoft Office 4.2 Standard Edition
Programs have consistent interfaces	YES	YES
Integrated E-mail, calendaring and scheduling**	YES	NO
Workgroup publishing features	YES	NO
Number of applications with OLE 2.0 support	Four	Three
Number of applications with on-the-fly spell checking	Three	One
Automated tasks that work independent of applications	YES	NO
Grammar checker can rewrite entire sentences	YES	NO
Intelligent find and replace	YES	NO
Ability to record scripts (macros) across applications	YES	NO
Supports both Visual Basic & AppWare programming tools	YES	NO
Six months of free, toll-free technical support*	YES	NO

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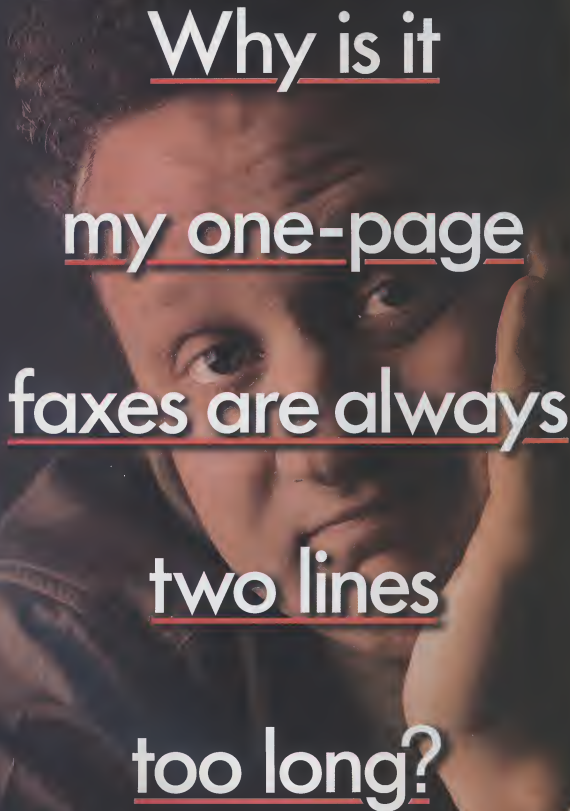
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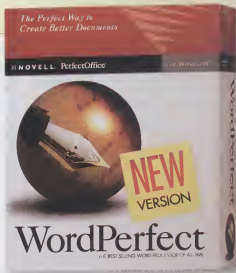
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A black and white photograph of a man with curly hair, looking directly at the camera with a thoughtful expression, his hand resting on his chin. The background is dark.

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USABILITY: Nonstandard keyboard. **
PERFORMANCE: The slowest tested. *
TECHNOLOGY: Parts is parts. *
VERDICT: High price and low speed. *

FILEBOX

Gateway P5-100XL

Pros: Plenty of drive bays inside.

Cons: Disappointing performance, high price, ugly enclosure.

Suitability: This is not in even the second tier of systems we'd choose.

\$4,279 list as tested
 Gateway 2000
 (800) 846-2000, (605) 232-2000
 Reader Service No. 667

All the check boxes are filled in. The component list looks good. But the Gateway 2000 P5-100XL had no 32-bit disk driver and was outperformed by every system we tested. And it's expensive.

Watchagot Stew Here's the component list you've been waiting for: 16MB of RAM, a 17-inch monitor, Western Digital's 1GB Caviar AC31000 hard disk, Ensoniq's Soundscape Wavetable 16-bit sound card, Mitsumi's quad-speed CD-ROM drive, and ATI Technologies' Mach 64 video card with 2MB of VRAM. The system has three PCI slots and four ISA slots, and one of each is shared. In all, a good assortment.

Gateway 2000's AnyKey keyboard is unique among the systems we looked at. It's oversized, with

two full sets of function keys (one on top, one down the side). For many people, that's a plus. However, the arrow key layout is awkward. Rather than the standard four-key inverted-T arrangement, the AnyKey uses nine arrow keys: up, down, left, right; four angled keys (up-left, up-right, down-left, and down-right); and one mystery key in the center.

The enclosure is well designed, with plenty of room inside. There are four internal drive bays, four full-sized external drive bays, and one half-sized external drive bay—and none of the components hamper access to the motherboard.

Mediocre Performance The performance of Gateway's P5-100XL was very disappointing: In fact, it was the slowest 100MHz Pentium system we tested. Why? A simple oversight, it would seem: The P5-100XL ships *sans* 32-bit disk driver for Windows. Without a 32-bit disk driver, the system must switch from Windows' protected mode to real mode for every disk operation—at a tremendous performance cost.

Why doesn't Gateway 2000 ship a 32-bit disk driver for Windows with its systems? A representative said that the driver is not included because Gateway's typical customer isn't sophisticated enough to configure it. If an owner wants the driver, he or she can download the file from Gateway's bulletin board.

Gateway's P5-100XL, at \$4,279, does not rank well among the systems we tested. For high performance and low price, you should look elsewhere.

Performance: Windows Apps



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Too Little, Too Much: The performance of Gateway 2000's P5-100XL was horrible—it was beaten in our benchmarks by both 90MHz Pentium systems.

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The World vs. Intel

IBM/Apple/Motorola

PowerPC 603 We've seen several PowerPC-based Macintoshes, and they're definitely fast. But the PowerPC 603 can run DOS and Windows software only through software emulation—a slow process at best. There are rumors of a PowerPC 615 that will be able to execute DOS and Windows by putting x86-compatible circuitry alongside the PowerPC circuitry. IBM will neither confirm nor deny the presence of this chip. But if the company did, it would probably say that we'd see the chip by the end of the year. Systems built on it will be considerably more expensive than standard PCs and will not provide any significant performance advantages for most business users.

Mips Technologies R4000 Let this processor disappear from your PC radar screen. The R4000 (the most common of the R4000 chips) is being installed in workstations and Windows NT boxes. But it needs to run DOS and Windows applications under software emulation and is therefore slow.

Product	x86 Compatible	Windows 3.1 Performance*	System Price*	System Availability
AMD K5	Yes	125% Faster	Slightly Lower	Q3 '95
Cyrix M1	Yes	125% Faster	Higher	Q3 '95
NexGen Nx586	Yes	Same	Lower	Now
IBM/Apple/Motorola PowerPC 603	No	20% Slower	Lower	Now
Mips R4000	No	20% Slower	Same	Now
DEC Alpha	No	10% Slower	Higher	Now
Intel P6	Yes	200% Faster	Same	Q3 '95

*ESTIMATED RELATIVE TO THE PENTIUM.

Digital Equipment Corporation Alpha Microprocessor Basically the same deal as with Mips processors, but Alpha ones generally perform better. They're also considerably more expensive.

Intel P6 The dream killer. Just as AMD and Cyrix will be releasing their Pentium killers, Intel will be showing systems built on its CPU with twice the performance (at least) and the same prices as existing systems. That will enable Intel to lower Pentium prices substantially—as much as a third. Watch for it.

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The 100MHz Pentium is currently Intel's top processor. You might think you'd have to pay top dollar for a system with one, and maybe you do, but top dollar is pretty low. In fact, given the attractive pricing of these systems and the length of their projected usefulness, you'd have to justify a slower processor.

Is a 100MHz Pentium system going to break the bank? No way. These systems came in at an average price of about \$4,000—about what you would have paid for a 66MHz 486 a year ago. The performance is about twice as good, and the components are excellent. One note on the prices of systems for our tests: We had the systems souped up with 16MB of RAM, a 1GB disk, a 16-bit sound card, and a 17-inch monitor. These are all components we recommend, but not ones that every user is going to buy.

Is a 100MHz Pentium system always faster than others? No. You're probably not too surprised by that answer. After all, there are 90MHz Pentium systems that outperform 100MHz ones. But you

might be surprised to learn that the fourth-fastest system we benchmarked for this review was a 90MHz Pentium. And it was one of the least expensive.

How much do other components affect system performance? A lot, especially when the component in question is a 32-bit disk driver for Windows. We found that adding a 32-bit disk driver can boost Windows performance by up to 20 percent. Similarly, a fast disk drive and a good graphics accelerator make a huge difference, as does having enough RAM. Spending money on a very fast processor makes no sense if you then skimp on other components.

Why buy a 100MHz Pentium? Right now, it may be that you can get a 66MHz 486DX2 for considerably less than a 100MHz Pentium. But down the road—in a year perhaps—when applications have gotten more bloated and less efficient, you're going to wish you had spent the extra money. In the end, you'll save money by purchasing a very fast, somewhat expensive computer and keeping it a long time.

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Circle 239 on reader service card.

What Would Freud Say?

I had another one of those crazy dreams last night. I was watching a race between a tortoise and a hare. The tortoise had a 90MHz Pentium multimedia system strapped on its back. The rabbit was pulling a cart with a 100MHz Pentium. They were neck and neck at



the crest of a hill when a cheetah hauling a Silicon Graphics Onyx gobbled up the rabbit, flipped the tortoise on its back, and disappeared in a blue streak down the hill. I went to see a psychiatrist friend, Dr. Lerner, to ask him about the significance of the dream.

"It's obvious. Your dream is about power. Since the beginning of time it has been crucial for man to be able to move quickly. The faster he could run, the better he could hunt food and avoid being trapped.

*Faster computers
are really about
rabbits, tortoises,
cheetahs, FOOD,
SEX, and, of
course,
SHAKESPEARE.*

Faster is always better, except for sex, where it's OK to go fast but not to finish fast."

"I don't think it's that deep, Doc. I just want the fastest machine on the market. The problem is I don't have the 800 grand to buy an Onyx."

"No. The problem is that you'll never be satisfied. You'll always want something faster."

The Doc was right. The challenge is not to have the fastest machine, it's learning how to use the time you spend waiting. Then I saw the answer: Desktop

Activity Centers (DACs). These provide an environment that surrounds your computer with opportunities for activities to keep you occupied when your computer is busy crunching numbers. Here are a few examples.

- The Gym DAC surrounds your operating system with racks of free weights and two multipurpose exercise machines. Use your downtime to pump up. Also available with the 40-pound exercise mouse and the abdominal trackball for people working on reducing their waistlines.

- The Aquarium DAC features a state-of-the-art Lucite aquarium that extends outward along the sides of the chair to enclose the user in a simulated under-

water environment. Downtime is spent cleaning the aquarium and feeding the fish.

- The Dodeca DAC consists of 12 computers arranged in a circle around a revolving chair in the center. While you're waiting for machine 1, you rotate and begin working on machine 2. This continues until you complete the circle.

- The Game Show DAC comes with a live host who sits quietly in a booth waiting for your machine to go into crunch mode. Whenever you're waiting, the host jumps from his booth and starts the show.

"Hey, how would you like to answer a few questions? Your first question is for 8MB of RAM. Are you ready?"

"Yeah, sure," you say eagerly.

"What is the speed of light?"

"That's easy. It's 186,282 miles per second, or 670,615,200 miles per hour."

"Correct."

"This is fun," you say. "Hurry up, ask me another."

"OK. This is for 16MB of RAM. What playwright created the characters whose names are used to identify the moons of Uranus?"

"Could you give me a clue?"

"He wrote 37 plays."

"Of course. William Shakespeare."

"Correct. Name the moons and the corresponding plays they came from."

"Uh, Cordelia, *King Lear*; Juliet, *Romeo and Juliet*; Puck, *A Midsummer Night's Dream*; Desdemona was..."

You're interrupted by your computer's ready signal informing you that it's eager to get back to work.

"Damn," you think. "These machines are too fast. There's no time to have fun anymore. I remember my first 286. It was slow, but there was so much extra time."

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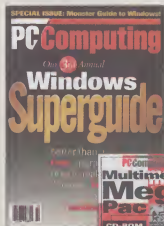
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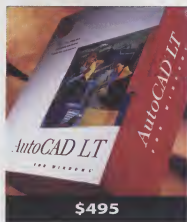
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The CPA vs. The CPU

SYNOPSIS

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Once, you balanced your checking account to within a cent almost effortlessly. Nowadays, you have more accounts, credit cards, and investments than you can count—let alone balance. If you're lucky, you have more money now, and more to track. As a financial tracking tool, that old ledger book doesn't cut it anymore.

The kind of help you need can be found only in a CPA—or a CPU.

The four major personal-finance software packages provide things your old checkbook registers and neat manila folders of bank statements couldn't hope to. Intuit's Quicken Deluxe 4 for Windows CD-ROM, Microsoft Money 3.0, Block Software's Managing Your Money 2.0 for Windows, and Computer Associates' Kiplinger's Simply Money 2.0 let you juggle multiple accounts, classify spending, set realistic budgets—and even balance your checkbook.

Sure, it's April and money's on your mind—specifically, the money you're about to give the tax man. These programs offer features—ease of use and real returns on the investment of your time—that will keep you paying the right kind of attention to your money every month. Without these features, your willingness to drag yourself to the PC and wallow in green (or worse, red) is likely to wane.

Which program best suits *your* financial profile? To answer this question, we opened our Usability Labs to a bevy of Windows users experienced with spreadsheets but without a decided preference in financial software. Each tester went through an exhaustive script that pushed the programs to the limit in some of the most common and important tasks facing users.

We examined some of the key factors that set the programs apart from each other. From the ever-popular game of "Hunt the Missing Check" to the electronic version of dental flossing—that is, backing up your data—the tasks you'll find yourself doing most often are covered here.

BY MATTHEW LAKE

A QUICK HIT: Microsoft Money 3.0's list boxes put all your accounts just a couple of mouse clicks away.

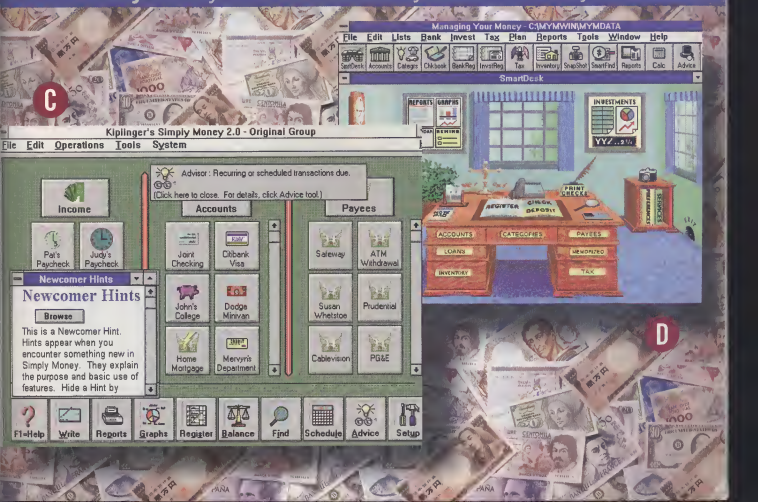
B HOMEWARD BOUND: Quicken Deluxe 4's HomeBase keeps the feature-packed program from getting unwieldy.

C SMART HELP: Newcomer Hints and a pop-up Advisor ease you into Kiplinger's Simply Money 2.0.

D LOOK FAMILIAR? Managing Your Money 2.0 uses a homey interface to draw you into the program.



Payoff: Put your hard-earned money where the usability is.

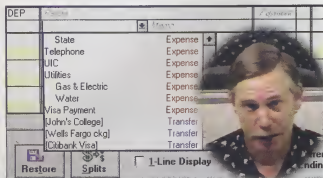


Factor 1: Setting Up and Updating Records

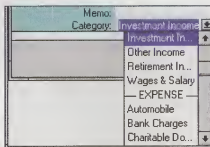


Job One is setting up accounts, which poses no problems in any of the programs. Jobs two, three, four, and so on, ad infinitum:

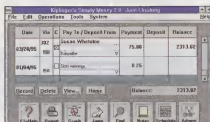
Updating your accounts. Recording transactions is the bread and butter of any personal finance program. And in this case, no matter what else was in the sandwich, none of the programs we tested held back on the bread and butter.



Your Daily Update: Our testers liked the fact that when you enter a deposit in Quicken, the scrolling list of categories covers every tax group imaginable—and even includes personal transfer categories. What they found not so handy is the fact that the transfers come at the bottom of a list of more than 30 groups.



Short and Sweet: Microsoft Money's category list is less complete than Quicken's—and less complicated.



Keep It Simple: Don't care for details, or want to set your own categories? Simply Money 2.0 is a fine choice.

The Script

How We Tested Updating Records
We gave our Usability Labs testers a list of transactions covering a couple of months. The transactions included setting up additional accounts.

Lab Notes

What Our Testers Said about Updating Records

"There are significantly fewer categories already on the system in Kiplinger's Simply Money. But I don't necessarily find that to be a problem. I'd rather create my own categories anyway."

ACCOUNTANT

"At first [setting up accounts in Managing Your Money] seemed easy, but the help screen should have been a bit more detailed."

MEDICAL LAB TECHNICIAN

Financial Updates

When you use a financial package, most of your time is spent entering data. Little things that cut corners are pounced on enthusiastically: Most testers in our Usability Labs were delighted that they could place recurring payees, such as utility companies, on a pick list for repeat payments.

All the programs have streamlined transaction entry to the point that all the packages were neck-and-neck in productivity. The consensus was that slick interfaces weren't just pretty—they really aided the process. When testers encountered a less-than-slick interface, like Kiplinger's Simply Money 2.0's, it didn't bother them much until they tried to set up new accounts. Managing Your Money 2.0's default interface—a checkbook instead of the other programs' check-register interface—also tripped up a few people: They tended to enter all their transactions in the checkbook instead of switching to the register. This method was more time-consuming. Even the widely loved Quicken Deluxe 4 for Windows CD-ROM offered so many payment/deposit options

that it often took several strokes of the Page Down key to get to the right one—which annoyed some testers.

If the prospect of becoming a data-entry clerk bothers you, there's one way around it. Subscribe to an online banking service and, for some between \$5 and \$15 a month, have your PC directly contact the bank's mainframe to sort it all out. While such automated services don't cover all the eventualities in banking, they are growing in popularity.

SUMMARY

	Quicken Deluxe 4	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
Satisfaction	Overall crowd-pleaser.	Another crowd-pleaser.	Niggles hampered usability.	Workable but not pretty.
Productivity	Earned high marks all around.	Earned high marks all around.	Earned high marks all around.	Earned high marks all around.
Help System	Flawed, but seldom needed. ***½	Rated highly all around. ****	Good, but seldom needed. ***½	Trailed behind the pack. ***½

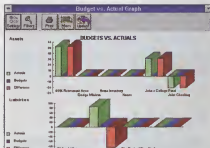
*****Excellent **** Good *** Acceptable ** Poor * Unacceptable

Factor 2: Creating a Budget

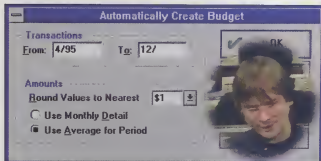
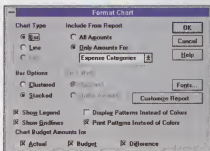


Who doesn't suspect they're spending too much money in some areas? After entering information into a financial package over a few months, you can chart just what those areas are. You can leave the budgeting up to the software, or do it yourself. If only *sticking to a budget* were this simple!

Managing Your Graphs: One of Managing Your Money's easiest budgeting features to use is graphing budgeted spending vs. actual spending.



Categorically Speaking: When charting budget categories in Microsoft Money, labels are often unreadable. The Format Chart dialog box solves that problem.



Your Personal Treasury Department: Wouldn't you rather have someone else do the legwork on your budget? Quicken takes much of the sting out of this chore with its AutoBudget feature. And, unlike other budgets that come ready-made, you can veto anything you don't like.

The Script

How We Tested Creating a Budget

With test accounts full of categorized information, we had each tester produce a chart of their spending and figure out a way to trim \$500 from it.

Lab Notes

What Our Testers Said about Creating a Budget

"Very easy. Microsoft Money worked exactly the way I normally do it."

CIVIL ENGINEER

"... one of the first times I've felt that purchasing a particular product [Quicken] could put more money back in my pocket than paid out."

CAMP MANAGER

On a Budget

Living beyond your means? It's the American way. But nobody likes burly debt collectors knocking at the door. So before things get out of hand, you'll want to set a budget—and stick to it. Without carefully tracking your spending, creating a realistic budget is a hit-or-miss endeavor. A decent personal-finance program can hand you everything you need—except willpower.

In theory, budgeting is a simple two-step procedure: Find out how you spend money, and limit the amount you spend in those areas where it's most realistic to do so. In reality, it's more complicated, of course—but having several months of financial records, and the software to manipulate them, eases the chore.

Of all the programs we looked at, only Quicken Deluxe 4 took a stab at trimming expenses in various categories, with its AutoBudget feature. Under lab conditions, the testers were glad for the help—but since silicon has no idea about lifestyles, the suggestions would sometimes have led to a Spartan existence. One was bemoaned, "This family isn't going to be

going out much or spending much on groceries!"

The real crux of budgeting is organizing and presenting your financial data so that you can make informed decisions. In this regard, all the programs delivered, although Kiplinger's Simply Money 2.0 left some users wanting more charting flexibility. Going through the categories to decide where to trim—always a tough task—was easiest with Quicken Deluxe 4 for Windows and Microsoft Money 3.0.

SUMMARY

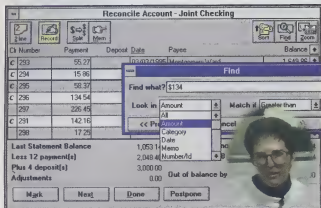
	Quicken Deluxe 4	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
Satisfaction	It does the work—that's satisfying.	Satisfying, with so-so productivity.	Charts were easy—the rest, less so.	Delivers, yet leaves you wanting more.
Productivity	Realistic budgets, quickly.	You feel more productive than you are.	Second-tier efficiency in this area.	Creating budgets was easy.
Help System	In the top tier of helpfulness.	Could be a little more helpful.	The strongest help system of all.	Could be a bit more helpful.
	****	***½	****½	***½

*****Excellent **** Good *** Acceptable ** Poor * Unacceptable

Factor 3: Reconciling Statements



You have your records. The banks have theirs. How often do you agree with *your* bank? Since neither of you is infallible, each month requires trotting out the statements to see who's got it right this time. At best, this is just a cross-check, but if there's an error at your end, quick and easy correction is a must.



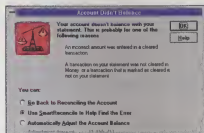
Hunt the Line Item: Managing Your Money's Find feature helps you with the process of reconciling your account statement against your personal records. Instead of hitting Page Up and Page Down at random, you can find the item quickly—and if your figures are wrong, you can still approximate your search with the Match if list box.

Reconciling Yourself

The most important lesson in personal finance is to make sure that you and your bank are on the same wavelength. Even tiny errors on either side can compound into significant problems. In the "gotta do it" stakes, reconciling your accounts with the bank's statements is second in importance only to entering transactions accurately. When you find an error, terminating it with extreme prejudice and great dispatch is crucial.

In our usability tests, all four programs presented all the information you would need to reconcile your accounts. No surprises there. In addition, most of our testers successfully completed the tasks on their scripts and were pretty satisfied with the software's ability to deal with the tasks.

Using Microsoft Money 3.0, the testers were moderately less productive in getting the job done, but this didn't affect their level of satisfaction with this program. Even the Help system's low success rate in solving problems (60 percent) didn't affect



Find the Offending Item: Screened up and don't know where? Microsoft Money's SmartReconcile can help.



Reduce Screen Clutter: Simply Money 2.0 keeps the number of visible entries to a minimum.

The Script

How We Tested Reconciling Statements

Our usability testers performed cross-checks against bank statements. We introduced errors to test correction capabilities.

Lab Notes

What Our Testers Said about Reconciling Statements

"This was a standard procedure. I had some problems getting into the right sections of Managing Your Money, but the User Guide helped right away."

RETIRE POLICE OFFICER

"I didn't like the way Simply Money's register was set up, and there was no obvious way to change the order of appearance."

ELECTRONICS SALES REPRESENTATIVE

satisfaction—a testament to the program's overall interface. With Quicken Deluxe 4, satisfaction and productivity were also high, but when the testers needed help, they found it only a quarter of the time. Only Managing Your Money 2.0 scored high consistently in the three key areas of user satisfaction, productivity, and help-system quality. It was a clear winner in reconciling statements, mainly due to the clarity and strength of its help system.

SUMMARY

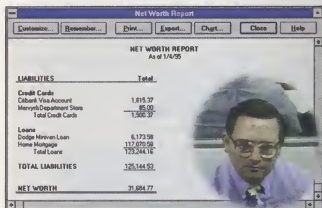
	Quicken Deluxe 4	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
Satisfaction	Points for clever dialog boxes.	Pleasant, despite delays.	Stellar help; navigation difficulties.	Plagued by inflexible categories.
Productivity	Fast and accurate throughput.	Takes a hair longer to do the job.	On a par with Quicken in ease and speed.	Keeps the pace in a fast field.
Help System	Effective only one time in four.	Flawed but still helpful, as needed.	Excellent for reconciling problems.	A hair better than Quicken's.
	****	****	****½	****½

*****Excellent **** Good *** Acceptable ** Poor * Unacceptable

Factor 4: Calculating Net Worth



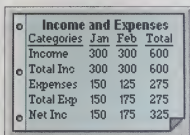
Like your high school grade point average, the horsepower of your car, and the size of your hard drive, your net worth is more than just a number. It's either a measure to be proud of, or a figure to be improved upon. Any way you look at it, it's something you want to know—either as a reward for your work, or as a means to encourage better money management.



It's a Snap: With Microsoft Money, all the steps you need to determine your net worth can be found under a single menu item and its dialog box. Getting this complete breakdown of assets and liabilities is not only easy, it's fast.



Quick Reports: Quicken's Create Report icon brings up a series of options and a preview.



Quick Hit: At a glance, Managing Your Money shows how you'll measure up each month.

The Script How We Tested Calculating Net Worth

Since this figure changes every month, we had our testers calculate revised net worth figures after entering data into each of the programs.

Lab Notes What Our Testers Said about Calculating Net Worth

"Until we have a telephatic interface and CPUs capable of following our mental instructions, it can't get much easier [than Quicken]."

CAMP MANAGER

"[Managing Your Money's] desktop was covering the scroll bar needed to view the bottom line. The graphics were in the way."

MEDICAL LAB
TECHNICIAN

What Are You Worth?

Like monetary exchange rates and the weather, your net worth changes constantly—sometimes imperceptibly, sometimes drastically. It's useful to note changes in your net worth for a variety of reasons—getting a loan, planning for the future, or just plain self-satisfaction. To some people, all three of these factors are equally important—but whatever your motivation, this is a common task that was easier with some packages than others—although all were more than up to the task.

As you'd expect for such a common job, each of the programs was more than a match to the task. However, not all the testers in the Usability Labs were a match for the software—and that's the fault of the software interface, not the testers. Microsoft Money 3.0 handled everything smoothly, and gleaned the greatest ratings in productivity and satisfaction. Second up was Quicken Deluxe 4, which trailed Microsoft Money by dint of its slightly lower productivity.

Though adequate to the task, Managing Your Money 2.0 and Kiplinger's Simply Money 2.0 lagged

behind Quicken and Money. Most noticeable in its shortcoming was the otherwise stellar Managing Your Money: The program's interface got in the way of the task it was attempting to solve, which held back many of our testers. Its help offerings—both online and in its documentation—proved to be of little help in getting to the bottom of the matter. Kiplinger's Simply Money's help system was only marginally more effective, delivering pertinent information only 50 percent of the time.

	SUMMARY	Quicken Deluxe 4	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
Satisfaction		Couldn't be better if it tried.	Menu-driven and painless.	Interface got in the way.	As hard to swallow as the result.
Productivity		Almost top of the line—close.	A1—top of the line.	Almost top of the line.	Almost top of the line.
Help System		No help required for task. ***½	The most helpful with task. ***½	Help is a misnomer here. ***	Unfortunately, not much help at all. ***½

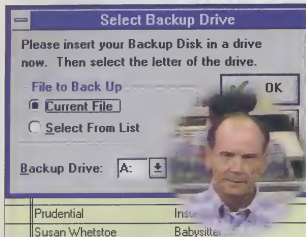
*****Excellent **** Good *** Acceptable ** Poor * Unacceptable

Face-off: Back It Up or Lose It

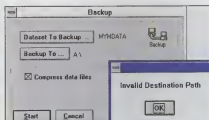
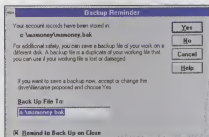
Factor 5: Backing Up Data



Of course you'll back up your records to a floppy disk—right? We thought so. Maybe even store them in a bank safe-deposit box—so that a little disk crash here and there will cost you only the price of a floppy and a bit of reinstallation time. As always, better safe than sorry.



Easy as Flossing: There's really no excuse for not backing up your Quicken files. Our testers found it easy to set up the process, and equally as easy to configure the backup drive with the aid of this simple dialog box. You can even have the software back up automatically when you quit the program.



The Script How We Tested Backing Up Data

Hard drives can be unreliable, so the crux of our test script was to make floppy-based backups.

Lab Notes What Our Testers Said about Backing Up Data

"[In Managing Your Money] the correct path was displayed, [and] the

Back Up and Go: Microsoft Money's backup reminder flashes as you quit the program. If this feature annoys you, simply uncheck the box in the lower left corner.

What's Wrong with This Picture? Strangely enough, the suggested backup path in Managing Your Money turned out to be invalid.

destination drive was displayed, but I was required to enter the path in the active box. I just went to File Manager to drag and drop."

CAMP MANAGER

Safety in Numbers

It's only the most fundamental lesson in computing: Back up everything, or risk losing everything. So why is there still a spread of ratings among these programs when it comes to backing up your financial data? And why did some of our usability testers resort to using the Windows File Manager to drag and drop files to a floppy disk?

It's not as if the program that trailed in the ratings is an immature product. Like the other programs, it's been on the market for years on one platform or another. Yet only a third of our testers succeeded in backing up files in Managing Your Money 2.0. And although everyone succeeded without any difficulty when using Kiplinger's Simply Money 2.0, the interface didn't earn high marks for subjective satisfaction from many of the testers.

Managing Your Money appears to have suffered from a usability bug that drove two-thirds of the testers to use File Manager for backup. When backing up from within Managing Your Money, you need to use the

destination path A:\MYMDATA\.. The catch: The program fails to create the directory for you, or even to tell you that you must create it yourself. Once you've cracked the "Invalid Path" problem (with little help from the program), backup is a breeze. But most people won't get there without a good deal of unnecessary effort. On the other hand, backing up was a cinch with Microsoft Money, involving nothing but a single command on a pull-down menu. Quicken was equally easy.

SUMMARY

	Quicken Deluxe 4	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
Satisfaction	Nothing to it—as it should be.	One command and it's done.	Type a directory path manually? No thanks!	You feel less productive than you are.
Productivity	Quick and problem-free.	Task completed fast.	This program's Achilles' heel.	Almost no problems here.
Help System	Not needed during this task.	Not needed during this task.	Not there when you need it.	Not needed during this task.
	★★★★½	★★★★½	★★½	★★★★

*****Excellent ****Good ***Acceptable **Poor *Unacceptable

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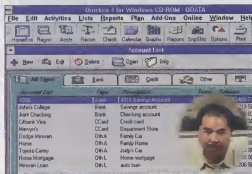
The Most Usable Software

PC
USABILITY
Tested

By definition, personal-finance software is not a professional tool—you don't use it for a living. It's also not recreational—you don't use it for fun. Software of this class lives or dies by how easy it makes the job—especially when that job is about as exciting as shaving and taking a shower.

Strictly from the perspective of getting five common tasks done quickly and easily (by users who

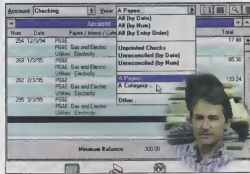
aren't familiar with the software), the clear winner is Quicken Deluxe 4 CD-ROM for Windows. Its smart arrangement, consistent help, and well-designed screens are real crowd-pleasing material. On a few occasions, we clocked our usability testers being more productive with Microsoft Money 3.0 and Managing Your Money 2.0—but overall, they were more satisfied with Quicken.



PC
USABILITY
Approved

Quicken Deluxe 4 for Windows:

With its depth and smart layout—including button bars and tabbed dialog boxes—Quicken provides features and usability in just the right combination to win over all our Usability Labs testers. ★★★★★



PC
USABILITY
Approved

Microsoft Money 3.0:

Microsoft Money is a quick learn, with drop-down list boxes, Windows-like minimized icons, and Wizards to help with difficult processes like loan evaluation and planning for retirement. ★★★

SATISFACTION: A pretty interface covers a multitude of sins. Microsoft Money and Quicken testers sometimes felt better about less efficient work—especially in budgeting.

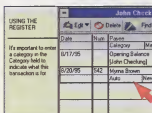
PRODUCTIVITY: *Block Software's Managing Your Money demonstrated itself to be every bit as productive as Quicken in all but two areas, and outdid Microsoft Money in three.*

HELP SYSTEM: *Flawed help tripped up an otherwise solid performance by Managing Your Money—and even proved to be a downfall for Quicken more than once.*

SUMMARY: *Even when it didn't do the best job of the bunch, Quicken scored the highest points with our testers. And more often than not, it actually did the best job at a given task.*

Lab Notes: What Testers Said about Finance Software

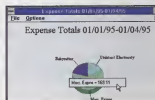
Quicken 4 for Windows



"The tutorial gave me more than enough guidance . . . the graphics didn't get in the way, but instead, complemented the usability of the package."

CAMP MANAGER

Kiplinger's Simply Money



"I suspect that if you wanted a different graph, it would be impossible to create. They give you what they feel is proper, but no flexibility."

ELECTRONICS SALES
REPRESENTATIVE

Managing Your Money

"Although the package makes setting up a budget easy enough, it takes more time than I have. And creating a modified budget seems difficult."

ACCOUNTANT

The Script

For every feature that includes usability testing, we design a script that consists of a set of common tasks. We report the test results in three key areas: User satisfaction, productivity, and help. The satisfaction score reflects the testers' preferences on a scale of one to five (in which five is best). The productivity score reflects the percentage of tasks completed. And the help score reflects the percentage of references to documentation and online help that actually assisted the testers.

SCORECARD WHICH CPA-IN-A-CPU IS FOR YOU?

Factor	Quicken Deluxe 4 for Windows	Microsoft Money 3.0	Managing Your Money 2.0	Simply Money 2.0
1. Setting Up and Updating Records <i>Weighting: 46%</i>	***** You can almost do it in your sleep.	**** Doesn't get much easier than this.	***** A basic function requiring only basic skills.	**** Not pretty, but that's not the point here.
2. Creating a Budget <i>Weighting: 18%</i>	**** Efficient and satisfying—not usual in budgeting.	***** Makes you feel more productive than you are.	***** Actually more productive than it feels.	***** Actually a lot more productive than it feels.
3. Reconciling Statements <i>Weighting: 18%</i>	***** The giant stumbles over its own help system. Tsk tsk!	**** A low success rate at finding help cramps its style.	***** It's the best of the bunch at this particular job.	***** Inflexible categories make things even harder.
4. Calculating Net Worth <i>Weighting: 9%</i>	***** Like finding a \$10 bill in an old jacket. Whoopee!	***** Like finding a \$20 bill in an old jacket. Double whoopee!	*** Like having a hole in your pocket. Curses!	***** Like finding loose change in an old jacket.
5. Backing Up Data <i>Weighting: 9%</i>	***** Backed up to the hilt and then some.	***** Backing up without backing down.	***** More like getting backed into a corner.	**** Backing up ain't hard to do.
Verdict 100%	*****½ Better than being a CPA—and a lot easier.	***** As good as being a CPA—and still easier.	*****½ Rock-solid with a few stumbling blocks.	*****½ More stumbling blocks than there should be.

How We Tested

Each tester worked through the same tasks, which took a total of about ten hours to complete. While the testers were at work, we observed them, timing their responses and videotaping their reactions. As always, we encouraged our testers to think out loud. You'll find some of their comments throughout this article. Finally, the testers rated their experience with the software subjectively in a debriefing session at the end of each day.

How To Contact

Quicken Deluxe 4 for Windows CD-ROM /
\$69.99 est. street price /
Intuit / (800) 624-8742 /
Reader Service No. 700

Microsoft Money 3.0 /
\$24.95 / Microsoft /
(800) 426-9400 /
Reader Service No. 701

Managing Your Money 2.0 for Windows /
\$79.95 / Block Software /
(800) 820-7458 /
Reader Service No. 702

Kiplinger's Simply Money 2.0 /
\$69.99 /
Computer Associates /
(800) 325-5324 /
Reader Service No. 703

***** Excellent **** Good *** Acceptable ** Poor * Unacceptable

Software to Bank On

Need an edge in today's financial battle? How about software that can help you tackle your specific financial problems? Sure, the personal-finance programs we tested can handle a wide variety of tasks, and many of them perform the same duties as those listed below. But they may not delve into your desired task thoroughly enough—or you may not need all of the frills that Quicken and the like offer. The products listed below are “magic bullets” that target specific problems and solve them.

Fighting Your Own Fiscal Skirmishes

Tools to Make the Most of Your Money

Problem	Product & Solution	Vital Statistics
Financial Advice You need to create your own financial plan.	Jonathan Pond's Personal Financial Planner Take Pond's Wealth Test and devise a plan tailored to meet your specific age, goals, income, and so on.	Vertigo Development Group (800) 942-2848; \$49.95 CD <i>Reader Service No. 704</i>
Technical Stock Analysis You need help analyzing stocks to decide which to acquire.	Windows on Wall Street Although it can't manage your portfolio, it's a great tool to help you choose the right investments.	MarketArts (800) 998-8439; \$149.95 <i>Reader Service No. 705</i>
Expense Reports You need to organize your expenses and get paid back in a timely manner.	QuickXpense for Windows Keep track of expenses electronically as you incur them, and even print reports on forms customized for your company.	Portable Software (800) 626-8620; \$69 <i>Reader Service No. 706</i>
Custom Spreadsheets You need to create your own spreadsheets.	Visual Baler Power without the bulk: This compiler lets you distribute your customized spreadsheet to as many people as you like, royalty-free.	Baler Software (800) 327-6108; \$299 <i>Reader Service No. 707</i>
Retirement Planning You need to figure out how much to put aside to enjoy your golden years.	Rich and Retired Going beyond the basic projections, it offers comprehensive tools for tracking expenses and holdings and organizing assets.	DataTech Software (717) 652-4344; \$59.95 <i>Reader Service No. 708</i>
Active Investment Guidance You need a personal investment coach.	WealthBuilder Your tour guide through investment decisions, this product also provides online research and trading capabilities.	Reality Online (800) 521-2475; \$99.95 <i>Reader Service No. 709</i>
Tax Software You need to stay out of trouble with the IRS.	TurboTax Multimedia With links to your Quicken files, it walks you through the tax code and new tax laws, and lets you file electronically.	Intuit (800) 964-1040; \$69.95 <i>Reader Service No. 710</i>
Mutual Fund Tracking You need to pick the right mutual funds and follow their progress.	Monocle Formerly known as FundPro, the upgraded version of this popular product adds not only a new name, but a trading-system module.	Manhattan Analytics (800) 251-3863; \$249 <i>Reader Service No. 711</i>
Business Plans You need to write a successful business plan with one product.	Business Plan Pro The one you've been waiting for. Everything you need in one package: text, charts, tables, and accurate cash-flow forecasting.	Palo Alto Software (800) 229-7526; \$149.95 <i>Reader Service No. 712</i>
Online Financial Forums You need to check out online information and browse forums.	CompuServe This service rules—in the financial forums arena, and in the number of files available to download—but the online time is pricey.	CompuServe (800) 848-8199; \$8.95/month <i>Reader Service No. 713</i>
Mortgage Tracking You need to analyze your mortgage options.	MortgagePlus The easy way to figure alternative mortgage calculations. A Tracker module answers questions about prepayment.	BitBrain Software (800) 944-4248; \$89 <i>Reader Service No. 714</i>



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The Compaq SmartStation offers full desktop and networking capability. (Monitor, keyboard and mouse sold separately.)

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- BUILT-IN ENHANCED EASTPOINT™ TRACKBALL
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Final Analysis: Where Should You Put Your Money?

Easy Money

Our usability testers, and the market at large, have come down resoundingly in favor of Quicken. Heck, even Microsoft joined the pack last year, when it announced its intention to acquire Quicken's publisher, Intuit, and to sell Microsoft Money to Novell. (As of press time it was not a done deal.) Does this mean you should follow the pack? Not necessarily. At *PC Computing*, we believe that one size *doesn't* fit all, and that, depending on your personal needs, one of the runners-up could do just as good a job—or even a better one.

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Budgeting

486, Pentium, PowerMac...

No matter how fast your PC is, it can't outrun a power problem (Get Uninterruptible...starting at \$119)

Just don't have the time for power problems on your PC? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes.

IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

In fact, you have better odds of winning the lottery than of escaping the sting of power problems on your PC. One study discovered a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse. And since sags and blackouts represent more than 85% of power problems likely to

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Audible and visual alarms alert you to power problems

Signals your computer, saves your data (APC software required)

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APC Uninterruptible Power Supplies provide instant battery backup to protect your data from loss and your hard drive from damage. Units are even backed by up to \$25,000 in lifetime surge protection insurance.

hit your computer, standard surge suppressors are literally powerless to protect you. And a study in a recent PCWeek showed that the largest single

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Carol Irvine, Wizard Assoc.

"We reduced our maintenance costs the first year by 50% in repairs of equipment..."
Valentin Gonzalez, Pfizer

"Our server was running a project when it lost power... messed up all the data files. It took four days to recover. But we don't worry anymore since we got APC..."
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C. Jeffrey, C. Jeffrey Eng.

"APC has virtually eliminated downtime in our corporate network..."

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Hime after over four years knows first hand about APC reliability. "It ought to be against the law to buy a computer without an APC Back-UPS 350. I recently had a direct lightning hit right outside the house... my computer never blinked."

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"Before I purchased the UPS I had to put in at least two hard drives at \$1000. With APC products... no new hard drives in two years!"
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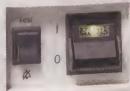
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They're Going for Your Wallet!

Have I shown you my wallet? Here, take a peek. The color LCD gives me a quick view of what I'm carrying: tickets to the theater tonight, \$700 in e-cash, my address book, and a video clip of my cat. What about my credit cards, you ask? They're



all stored here digitally. Ditto my driver's license and ID. This infrared port? It transfers the information when I need to buy something at a store or on the Net, then balances my checkbook automatically.

If this sounds like science fiction, that's because it is—although not by much. A variation on this electronic purse, dubbed the Wallet PC by Bill Gates, is already on the drawing board at Microsoft. The software giant isn't the only one fingering your wallet,

*It's becoming
APPARENT that
the next
FRONTIER of
high technology
will be your
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either: As the major online services and the Internet increasingly become an electronic mall for information and services, it's becoming apparent that the next frontier of high technology will be your pocketbook.

E-Cash Everywhere you look, cash is going digital. Merchants and banks such as National Westminster, British Telecommunications, and Midland Bank, are running pilot tests for *smart cards*—computer chips embedded in plastic, designed to replace paper and coins. Download digital money onto a card and you can use it to pay for everything from a 75-cent cup of coffee to a \$3 subway ride. This marriage of plastic and silicon can even be used to replace house keys and ID cards, or to pay for online transactions from your set-top cable box or computer. Personal-finance packages like Intuit's Quicken and Microsoft Money, meanwhile, could well become your primary interface to the bank.

How soon? Future-watcher Michael Schneider, president of the research firm Integrated Business Information Systems (IBIS) in New Haven, Connecticut, predicts the move to smart cards will happen

quickly. According to his firm's estimates, by 1998 100 million smart cards could be in use in the United States, with automatic teller machines and credit cards leading the transformation. If you think that sounds incredible, witness the rate at which credit cards and ATMs caught on: Back in 1958, the Bank of America introduced the first credit cards to 58,000 of its customers. By 1970, 100 million consumers were paying with plastic. These days, do you know anyone who doesn't have an ATM or credit card?

Other models for e-cash are also evolving, particularly for online transactions. An Amsterdam firm called DigiCash is now running trials with make-believe e-money that dozens of merchants on the Internet will accept. Consumers can download the software for free on the Net, register their credit card numbers and passwords online, then download cash from their credit cards onto their hard drives.

E-Banking First Virtual Holdings of Cheyenne, Wyoming, operates as an online bank where both buyer and seller have accounts. When you make a purchase, you send the seller your account number and First Virtual charges your conventional credit card. CyberCash, in Reston, Virginia, is introducing a system that will let consumers purchase items on the Net with credit cards, or by near-instantaneous debits of their bank accounts.

With so many e-cash experiments in the works, it might seem surprising that we're still counting pennies. To paraphrase cyberfiction writer William Gibson, the future has already arrived—it's just not evenly distributed yet. The prickly issues of privacy and security—not to mention standards—for digital transactions are only just now being hammered out by service providers and software makers. For businesses that catch on early, however, the returns promise to be staggering.

Reviews Editor WENDY TAYLOR looks forward to carrying video clips of her cat, Basil, in her wallet.

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Microboards Playwrite 1000

Philips CDD521/522
Pleximon RF4000/4100
Ricoh RSP200CD

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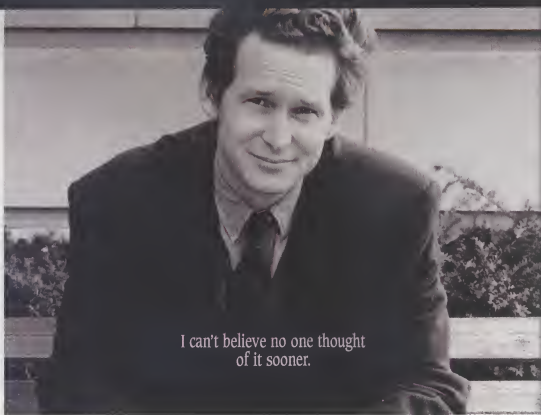


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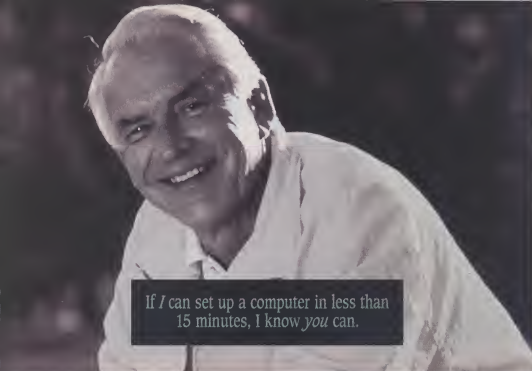


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"...a breeze to unpack. The large Instruction sheet explained the assembly process easily."

PC Computing, Dec. 1994

"...A.C.E. Windows front end is one of the best around."

PC Magazine, Dec. 20, 1994

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PC Magazine, Dec. 20, 1994

Acer 

Circle 146 on reader service card.

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Windows 95

Unv

The *National Enquirer* doesn't have a reporter assigned to the Windows 95 beat yet. But when that day comes, here are three of the stories you're most likely to read:

- Elvis is impressed with Microsoft's multimedia support, but he still

Counterpoint

Chicago is a fraud. . . . If you're a marketer . . . you'd better redo your revenue plan quick. The chances that Chicago/Windows 4.0 will ever provide a reliable, "industrial strength" platform on which to run Win32 applications are slim to none. Windows NT, despite its bloated resource requirements, is at least a real operating system. Chicago is not.

William F. Zachmann
Marketing Computers, May 1994

can't get The Lion King CD to work.

- Bigfoot's a beta tester, but he won't upgrade his network to the new Windows until all of the TCP/IP bugs are worked out.
- Geraldo has the videotapes that prove once and for all what *really* goes on inside Microsoft's usability lab.

Think we're exaggerating? Just wait until the television advertising starts in earnest, and the daily newspapers start sending their most technologically challenged writers to

Revealed

The 10 Biggest Lies

CompUSA to get the lowdown on Windows 95. Meanwhile, the spin doctors at Microsoft and IBM are cranking up the hype machines. And anyone else with a 32-bit ax to grind will surely add to the noise level.

What's most impressive about the tapestry of lies, misinformation, and half-truths surrounding Windows 95 is the sheer breadth and variety of it all.

We've been collecting Windows 95 whoppers for more than a year. If you haven't heard any of them yet, just wait.

You could ignore the lies, but we have a better idea. Why not fight back with the facts? We've cut through the hype behind the ten biggest lies. If you want the real story, skip the *National Enquirer* and keep reading.

Besides, our well-informed sources say Elvis is still using an Amiga.

Counterpoint

Chicago **sounds great on paper**, but that doesn't mean that it will be an instant success. Microsoft's sales projections are incredibly aggressive—some officials predict 30 to 40 million copies the first year. But don't forget that this is the same company that predicted NT would sell 2.5 million copies the first year. . . . And now admits that actual sales will be more like 850,000.

Jesse Berst
Windows Watcher, March 1994

Lie #1: Windows 95 is an all-new, all-32-bit operating system.

To some people, 32-bitness is practically a religious issue. And for sheer emotional intensity, there's nothing like a good religious debate.

In the Middle Ages, any monk worth his tonsure could rattle off convoluted and carefully reasoned arguments to explain mystical phenomena, such as the exact number of angels that can dance on the head of a pin. Eventually, these debates ceased to be enlightening and devolved into pointless (and seemingly endless) exercises in logical hair-splitting.

Roughly the same thing happens when the topic turns to the 32-bitness of Windows 95. The most persuasive advocate for the opposition is programmer extraordinaire Andrew Schulman, whose *Unauthorized Windows 95* is filled with juicy details on the inner workings of the new operating system. Schulman argues that Windows 95's IO.SYS, the file that shifts your PC out of park every time you boot up, is nothing more than

good-old, real-mode DOS in a clever disguise. Microsoft contends that Schulman's analysis is based on an early beta version of Windows 95, and that a limited amount of real-mode baggage is there for a good reason: to guarantee compatibility with old DOS and Windows applications and real-mode NetWare drivers.

Should you care about this debate? Here are the simple, nondenominational facts:

- **All new?** Not really. There's plenty of Windows 95 code that has been around for awhile, including the 32-bit disk and file-access modules that first appeared 18 months ago in Windows for Workgroups 3.11.

- **All 32-bit?** Not exactly. There are still big chunks of 16-bit code scattered throughout Windows 95, including USER.EXE, which manages windows, menus, and other GUI bits; and GDI.EXE, the Graphic Device Interface, which mediates between Windows and your video hardware.

- **Protected mode?** Mostly. The majority of I/O operations—including those to the file system, CD-ROM drives, and networks—take

place in protected mode. Memory management and process management are also fully protected. But every Windows 95 system boots into real mode first, giving the system the chance to load old device and network drivers that don't have protected-mode Windows 95 equivalents. And the file system does a certain amount of real-mode housekeeping to keep old applications informed of important system events.

To operating system zealots, these are issues of life-and-death importance. To the rest of us, it's just another category in Technotrivial Pursuit.

But the bottom line is, if for some reason you want an all-32-bit operating system that runs exclusively in protected mode, you'll want another operating system like Windows NT, Unix, or OS/2. (Your reason probably wouldn't be that you'll find a million shrink-wrapped productivity apps for it.) If, on the other hand, you're looking for a Windows upgrade that's generally faster and more stable than the version you use now, you'll be interested in Windows 95. And you'll leave the 32-bit debate to the Jesuits.

Counterpoint

Chicago is likely to match everything the current-generation Mac OS does, plus up the ante with a better user interface. . . . I am not sure the marketplace is prepared for how much Chicago mimes Macintosh. It is even possible that Microsoft has done too good a job and will **alienate current customers** with an upgrade which veers too far from the classic Windows user interface I've come to dislike so much.

David Coursey
P.C. Letter
May 2, 1994

Lie #2: DOS is dead.

Freddy Krueger has nothing on DOS, the operating system that refuses to die. Stab it, shoot it, poison it, or bury it under 60 million shrink-wrapped copies of Windows, and DOS still comes back for more.

No, DOS is not dead (although how many have suffered at its hands we'll never know). As long as there are DOS applications, DOS will survive. You certainly don't have to search too hard within Windows 95 to find DOS's strong vital signs.

The good ol' MS-DOS icon is right there on the Start menu. If you install Windows 95 over DOS, you can press F8 at boot time and choose DOS from the character-based menu that comes up. And if you have a funky old DOS app that refuses to run under Windows,

you can even send your PC into MS-DOS mode, a sort of digital fugue state that clears away all traces of Windows 95 while you boot into something that looks remarkably like . . . MS-DOS.

At last count, MS-DOS was Microsoft's cash cow, selling 2 million copies a month. The Windows 95 marketers will use every tactic imaginable to sell Windows 95 to those 2 million customers. But what if they say no? Will Microsoft turn down a paying customer? Will it steer DOS users toward IBM? Not likely.

IBM and Microsoft have each publicly announced their intentions to deliver another version of DOS.

MS-DOS? It should hit the streets around the same time as *Nightmare on Elm Street Part XXV*.

Lie #3: The new hardware you'll need will cost a fortune.

Whether the hardware upgrades you need to run Windows 95 cost a fortune depends on your definition of a fortune. It also depends on how up-to-date your hardware is. If you're already running Windows for Workgroups 3.11 on a PC that's less than three years old, you won't even notice the difference. If your existing hardware is underpowered, you can probably bring it up to Windows 95 standards for less than the cost of dinner for two and a modest Bordeaux.

So how much hardware will you really need to run Windows 95? Pay no attention to the guidelines in the official Microsoft press releases; following is the consensus of just about

everyone we talked to who's used Windows 95:

- **CPU** How much CPU is enough? Pentiums are perfect. A 486 is a safe bet at any speed, although a 25MHz 486SX runs out of gas a bit too quickly. At 33MHz and up, any 386DX will work quite nicely, thank you. What about those creaky old 386SX machines? Paperweights. Boat anchors. Door stops, maybe. But definitely not Windows 95 machines. In fact, Windows 95 will leave out some of its cooler graphic tricks if you install it on a slow 386.

- **Memory** Don't believe anyone who says you can run Windows 95 in 4MB. On that minimalist machine,

you can probably load Windows 95, a copy of 32-bit Notepad, and the Dilbert screen saver. If you want to do anything more—and especially if you even want to think about sharing data with the help of OLE—you'll need the extra four megs. You've known for at least two years that 8MB is the practical minimum for a Windows PC. Windows 95 just adds a few exclamation points to that basic truth. Each 4MB upgrade will add \$160 or so to the total tab for a Windows 95 PC.

- **Hard Disk** Do you have a spare 60MB on your hard disk? Kiss it goodbye. You can reclaim thirty-something megabytes if you're willing to wipe out old versions of DOS and Windows after you've installed Windows 95. At the going bargain-basement rate of 75 cents a megabyte, that's somewhere between \$20 and \$45 worth of hard disk. A pittance, really.

The most common upgrade is likely to be memory. OK, at \$160 a pop, maybe we're talking about dinner for two at Spago and an extremely drinkable Bordeaux. But it won't cost you a fortune to get your hardware ready for the new Windows.

How Much Hardware Will You Need?

Component	Unacceptable	We Recommend
CPU	386SX or 386 less than 33MHz	486 or Pentium
Memory	4MB or less	8MB or more
Hard Disk	120MB or less	200MB or more
Other Peripherals	CGA or EGA graphics	CD-ROM, Plug-and-Play system BIOS

Lie #4: Users will be productive within minutes.

Late last year, just after the second beta release of Windows 95 went out the door, Microsoft commissioned Usability Sciences Corporation to put 75 typical users through comparative tests of Windows 95 and Windows 3.1. The conclusion? According to Microsoft's press release: "For organizations migrating to Windows 95, the results indicate that retraining should be minimal and, once users have moved to Windows 95, they will be almost twice as fast as they were under Windows 3.1. The study found that users of Windows 3.1 with only 20 minutes of exposure to Windows 95 were nearly as productive on the new system. . . . After just 90 minutes of using Windows 95, these users were twice as fast performing common tasks under

Windows 95, compared with their performance of the same types of tasks under Windows 3.1."

Duh.

What would you expect? That new users would simply stare at the screen for 20 minutes, turn to the usability lab manager, shrug their shoulders, and say, "I don't get it?"

Besides, anyone who's tried to explain the Program Manager/File Manager mess to a Windows newbie knows that it would be nearly impossible to design a less usable interface. Microsoft's usability test results say more about the unintuitive, unproductive Windows 3.1 interface than they do about its replacement.

Counterpoint

Windows applications running under Windows 95 will still end up using

MS-DOS. Windows 95 is based on the same architecture as Windows 3.x

Enhanced mode. . . . From a technical perspective, Windows 95 is

not a revolutionary product. It's just Windows 90 + 5.

Andrew Schulman, Unauthorized Windows 95

Multitasking

The organizations with the biggest challenge ahead are those that have painstakingly trained a computer-phobic staff to deal with all of Windows 3.1's quirks. Power users will lose a few weeks of productivity as they surrender to curiosity and wander purposefully through every nook and cranny of Windows 95. Clueless newbies will need even more help in the form of day-long courses, all-new cheat sheets, plenty of hand-holding, and a well-staffed help desk.

After the Microsoft-commissioned test was complete, Usability Sciences asked the test subjects for their comparative judgments of both versions of Windows. A significant number (32

percent) thought that Windows 3.1 was "easier to use" than Windows 95, and the majority (64 percent) were actually "more comfortable" with the familiar Windows 3.1, usability warts and all. Are you prepared for an office full of slightly more productive, mostly uncomfortable Windows 95 users?

John C. Dvorak, PC Magazine, November 22, 1994

Counterpoint

Microsoft shows so **little confidence in Chicago** (do I really want to call this thing Microsoft Windows 95?) that it hasn't ported the interface to Windows NT. The company wants to see the reaction to the new interface before committing to it completely.

Windows 95 includes an excellent tutorial. The interface is generally consistent and well thought out, with good ideas borrowed from just about everywhere. But the implication that new users can become truly productive without serious training and a reasonable transition period is absurd.

Lie #5: Windows 95 is a powerful multitasking operating system.

Is Windows 95 powerful like Superman? Maybe. But Superman has to steer clear of kryptonite, and if you run Windows 95 in hopes of powerful multitasking, you should know about a 16-bit chunk of digital kryptonite that's buried in Windows 95.

Here's the plain, unvarnished truth: As long as you continue to use 16-bit Windows apps, you'll probably be disappointed by the multitasking capabilities of Windows 95. You may find its performance moderately better than previous versions of Windows. If both of the applications you're trying to use simultaneously are well written and

well behaved, you may be pleasantly surprised. But until you replace all of your apps with 32-bit upgrades, you'll have plenty of opportunities to study the Windows 95 hourglass.

If you're cornered at a cocktail party by some boor who insists on whining about Windows 95's wimpy multitasking, just nod knowingly and blame it all on the Win16Mutex—that's the programmer's function call that locks up the entire 16-bit Windows subsystem until the program that claimed the Win16Mutex decides to check its messages. If you're unlucky enough to be running a 16-bit Windows application

that checks its messages only every 20 seconds, you're in for some serious finger-drumming.

The problem is even worse than it appears. The Windows graphical interface, USER.EXE, is itself a 16-bit application (see Lie #1 if you need a refresher course). So when a hoggish 16-bit Windows app grabs the Win16Mutex and won't let go, you can't do much more than move the mouse pointer around. Mouse clicks go straight into the void. The keyboard stops responding. Windows no longer redraw. Yes, any apps that are already executing will continue to run. If they're using 32-bit subsystems like the new and improved communications module, they'll chug away impressively. But you won't be able to start a new task, even a 32-bit one, until Win16Mutex says it's OK.

You say you want to leap tall buildings while simultaneously running a database that's more powerful than a locomotive? If multitasking really matters to you, replace your 16-bit Windows apps faster than a speeding bullet.

Of course, even when multitasking doesn't quite work, Windows 95 makes it at least slightly more bearable because you can replace the hourglass with an animated cursor in the shape of a banana (it peels), a purple dinosaur (it walks), or a set of fingers drumming on the desktop.

Windows: Rapid Acceleration



Vaporware? There are already 400,000 Windows 95 beta testers and some analysts predict at least 20 million users will buy the final product.

Lie #6: Plug and Play will never work.

Remember the one about the elephant that danced *Swan Lake*? Anyone who pointed out that the pachyderm lacked Nureyev's style and grace missed the point completely. This is an elephant, after all, doing classical ballet.

It's not appreciably more absurd than the challenge of getting an installed base of tens of millions of PCs and peripherals, hobbled by the PC's original resource limitations, to occupy the same stage without crashing into one another. It's an enormous challenge.

Yes, Plug and Play works, as long as you set realistic expectations. There are thousands upon thousands of species of add-in cards and PC peripherals in the world. The technical term for these devices is legacy

hardware, which is a nice way of saying "stuff we already paid for that the CFO won't let us replace because it isn't fully depreciated yet." Most legacy hardware was designed in an era when Plug and Play was something that Jimi Hendrix did.

The pleasant surprise is that Windows 95 handles so many of these relics without human intervention. Windows 95's autodetect capabilities are surprisingly effective. Even in early beta versions, it's great with network cards, pretty good with sound cards and video adapters, and a whiz with printers and modems. The operating system has Wizards to help you install most peripherals. There's even a troubleshooting Wizard that will walk you through the dirty work of

resolving an interrupt-request or memory-address conflict.

There will be exceptions, but most new devices that carry the Plug-and-Play label will simply work. And that's especially true of mass-market phenomena like multimedia upgrade kits, which are nothing short of torture for unprepared users running DOS and Windows 3.1.

Plug and Play can't do much for dopey devices that have resource assignments like IRQ settings and direct-memory-access channels hardwired into their printed-circuit traces. It can't tell you what those unlabeled jumpers and dip switches do. And it can't magically update funky old device drivers written in the DOS 2.0 era.

But it sure beats the alternative.

Counterpoint

Windows was just a stopover on the way to OS/2. Then OS/2 was cut loose and Windows was just a stopover on the way to Windows NT. Then NT bombed as a desktop OS and Windows became a stopover on the way to Chicago. Any product with that many stopovers needs an airline reservation system—which airline, we're not sure, because most of them don't crash as much.

Nicholas Petreley
InfoWorld
October 17, 1994

Lie #7: You'll love long filenames.

Working with Windows 95's long filenames is like hefting a sturdy rubber mallet. It's a wonderfully useful tool for certain jobs, but you'll agree that pounding yourself on the forehead isn't one of them.

Long filenames will have almost no side effects for Windows users who never share files with anyone else, aren't on networks, and use only brand-new apps that have qualified for the Windows 95 logo. But there are all sorts of gotchas in store for the vast majority of users.

What happens when a 16-bit DOS or Windows app sees a long filename? Let's say you've used your Windows 95 version of Word to save a file that you've imaginatively named "This is Acme Corporation's 1996 marketing plan.doc." (You're right, file extensions do look stupid when tacked onto the end of a long filename, but that's another debate.) Because compatibility is a crucial part of the operating system's architecture, Windows 95 actually stores two filenames—your original, plus a truncated eight-dot-three version. And if someone else on the network uses the 16-bit version of Word to open that file, change a single

sentence, and save it back to disk, the long filename will vanish in a puff of smoke. When you go looking for your marketing plan, how will you know that it's been renamed THISISAC.DOC?

The algorithm that translates long filenames into eight-dot-three versions isn't particularly elegant, either. Windows 95 just grabs the first eight characters of the long name and adds the first three letters of the extension. If there's already a file with that short name, the file system slices off the first six characters from the long name, then tacks on a tilde and a number (~1). If you're not careful, you'll wind up with a folder full of inscrutable files called THISIS~1, THISIS~2, and so on.

What about networks? With NT servers, long filenames are, obviously, fully supported. And because NT talks to Macintoshes, those filenames will be intact as well. But if you want your NetWare volumes to speak LFN (long filename), you have to install the OS/2 Name Space to let the server emulate an OS/2 High Performance File System (HPFS) volume.

Good luck convincing your network administrator. Maybe you should bring along that rubber mallet.

Lie #8: Windows 95 means you'll never need another utility.

Remember when pundits said that with DOS 5 you'd never need another utility program? But in the wake of DOS 5, Qualitas, Quarterdeck Office Systems, and Symantec all had record years. Windows 95 will follow the same pattern.

Humongous, everything-but-the-kitchen-sink shell replacements like Symantec's Norton Desktop for Windows are out, but there's still plenty of room for well-crafted utilities that do one job with a minimum of fuss and overhead.

Here are just a few of the utilities that you won't find in Windows 95:

- **Virus Checkers** The old 16-bit DOS utility, Microsoft Anti-Virus, won't work with Windows 95. Worse yet, you'll have to watch out for self-installing CD-borne viruses, too. Thanks to Windows 95's Mac-like AutoPlay capabilities, these can be installed without your knowledge.

- **Backup** The backup utility included with Windows 95 doesn't work with SCSI tape drives.

- **File Management** File Manager's replacement, Explorer, is a third-party opportunity waiting to happen. Add-ins, add-ons, and outright replacements will find plenty of takers.

Some of the utilities that are bundled into Windows 95 even have built-in upgrade paths. For example, take the Windows 95 Quick View utility, which lets you peek inside a file even if you don't own the application that created it. If you want the full-strength version with clipboard and printer support, you have to pay for Quick View Plus, the much-improved upgrade from Systems Compatibility Corporation.

No more utilities? Don't be silly. In fact, this time around, Peter Norton may roll up his sleeves, cross his arms, and actually crack a smile.

Lie #9: IBM can rewrite OS/2 to work with 32-bit apps.

You'll hear this whopper over and over from die-hard defenders of OS/2. They'll tell you that OS/2 can be rewritten to work with 32-bit applications. They'll tell you—correctly—that there aren't many 32-bit Windows applications yet, so what's the big deal? They'll quote Lois Dimpfel, the head of IBM's OS/2 development team, who has said: "If there is a compelling reason to support the [Windows 95] API, we will do that." They'll point out that OS/2 already runs a handful of 32-bit Windows applications—the ones written using Microsoft's Win32s application programming interface (API).

And because OS/2 already runs virtually all Windows 3.1 applications

without too much fuss, they'll tell you it's no big deal: Just add a little fresh code, a pinch of Win32 APIs, stir, and voilà: OS/2 Warp 95.

They're wrong.

Here's the problem: Today, OS/2 runs Windows 3.1 applications because it actually runs Windows 3.1—every single line of the true-blue Microsoft source code, given to IBM in a joint development agreement with Microsoft that ended in late 1993. In 1995, IBM no longer has the keys to the Windows vault, and reverse-engineering Windows 95 is a major development effort that would probably start to pay off right around the time Microsoft sends the first beta

copies of Windows 99 into the field.

If it were easy to clone Windows, IBM would have already figured out a way to make OS/2 work with the virtual device drivers in Windows for Workgroups 3.11. But IBM's programmers haven't succeeded in building a Windows work-alike yet, and they're not likely to do it anytime soon.

The slim crop of Win32s applications, like Mosaic 2.0 and SPSS's SPSS for Windows, runs 32-bit code for performance reasons, but the applications don't take advantage of multithreading, the new Windows interface, or asynchronous input queues. Software developers argue that the *s* in Win32s—which supposedly stands for *subset*—really means *stopgap*. All serious development work for new Windows applications is being done with the Win32 API—the full-strength 32-bit version that won't run under OS/2 Warp.

Of course, there's one surefire way to get OS/2 Warp and Windows 95 to coexist. IBM and Microsoft could sign a brand-new joint development agreement, with IBM agreeing to pay Microsoft a few hundred million dollars in licensing fees.

When your operating system is named after a science-fiction plot device, anything's possible.

Counterpoint

What a load of malarkey Microsoft has unloaded on us with Windows 95!

A model year like cars? I imagine you IS managers are just dying to get new models of software the way you get new models of cars. Don't have to suffer through version numbers? The only people who suffer version numbers are vendors, because versioning is a precise way of communicating to customers exactly what they are getting, and vendors hate to have to admit exactly what they have done.

Stewart Alsop, InfoWorld, September 19, 1994

People just want Windows to work faster and more reliably on the PCs they already have. Chicago won't. Chicago, with all its baggage, means another **painful, expensive round of hardware upgrades,** software upgrades, and ditching of suddenly obsolete equipment. Plus another new user interface to learn. . . . But for readers who don't get paid to fall in love with new technology, and just want their PCs to work right for once so that they can get on to more important matters, I'm afraid that Chicago may be just one more small step on a long road.

Paul Bonner, Computer Shopper, July 1994

Lie #10: Windows 95 is vaporware.

There are hundreds of sleep-deprived developers, testers, and lab rats at Microsoft's Redmond, Washington campus who *wish* that this lie were true—especially the ones who have more than 100 "Priority One" bugs on their to-do lists.

Windows 95, which was No. 1 with a bullet on the Vaporware Top Ten for years, may not yet be commercially available, but it isn't vaporware either. To understand the distinction, we need to examine the life cycle of a software product, a biotechnological phenomenon that makes frogs and butterflies look downright simple in comparison.

In the beginning—as any venture capitalist can tell you—every new piece of software starts out as a wish list filled with cool product specifications. If you work for a marketing-driven company like Microsoft, this is the appropriate time to invent a catchy code name and a secret logo. This is pure, uncut vaporware—the kind that's worth millions of dollars on the street. Windows 95 was vaporware until midway through 1993.

No one can survive on pure vapor for long, of course. So, as soon as there's enough code to get past the logo screen, the developers set up private demonstrations to prove that their hot new product isn't vaporware anymore. Technically, any product that reaches this stage is still mostly vapor, but it's more accurate to call it demoware. It's not hard to

spot: If the product managers showing off the software stop breathing every time they click on a menu choice, it's demoware. Windows 95 was demoware until about May 1994. (Some industry pundits still allude to parts of Windows 95 as "clever Visual Basic prototypes.")

Sooner or later (usually later), a piece of software actually gets into the hands of potential customers. If the software will do little more than what it did in the demo, we can safely call it an alpha version. If more than half of the users can get real work done with the help of the program, even if they run into a bug every 20 minutes, it deserves to be called beta software. This version of Windows has been genuinely usable beta software for nearly a year now.

Microsoft plans to release the Preview edition of Windows 95 "real soon now." In exchange for \$30, you and 400,000 close friends will get disks, manuals, and four pages of disclaimers printed in 6-point Arial Extra Condensed. It will still have bugs. It won't work with all your old DOS and Windows applications. A significant number of users will have trouble with specific types of hardware and networks.

Vaporware? Count your blessings that Windows 95 hasn't emerged from vapor yet. There's nothing mythical about the headache you'll get from a buggy operating system.

More Lies?

There's no shortage of misinformation about Windows 95. But some lies are easier to dismiss than others.

1 Windows 95 is NT Lite. Let's put it a slightly different way: There's Frank Sinatra, and there's Frank Jr. Any questions?

2 Windows 3.1 has no future. Never underestimate the power of the installed base—especially when it's 60-million strong. DOS is still a remarkably popular operating system, after all.

3 Microsoft finally fixed all the problems with OLE. Rome wasn't rebuilt in a day. Expect it to burn down once or twice more.

4 Windows 95 will make the Internet easy. Zen koan: What happens when an irresistible force meets an immovable object?

5 Peer networking is all most Windows 95 users will ever need. An interesting theory, but nobody we know is working on client-client applications.

6 Your PC will never crash again. And Volvos are the safest car on the road. But buckle your seat belt, just in case.

7 Windows 95 will do away with irritating configuration files. The Registry makes SYSTEM.INI look like a McGuffey Eclectic Reader.

8 The Microsoft Network will crush every other online service overnight. Unless the Internet, with its 20 million users and 25-year head start, crushes everyone.

9 Microsoft's secret plan is to sneak NT onto everyone's desktop. So, what's the secret?

10 Windows 95 is the final nail in Apple's coffin. But what about . . . I mean . . . hmmm . . . maybe this one isn't a myth, after all.

A road map for the



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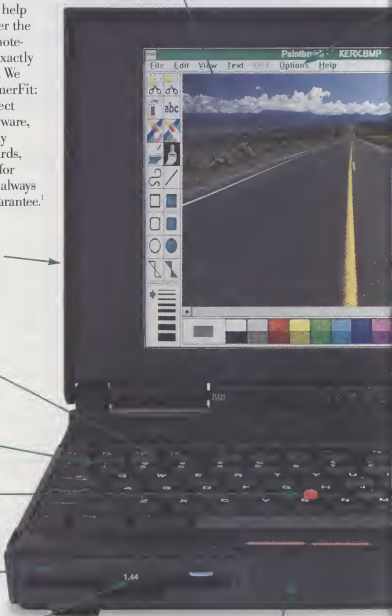
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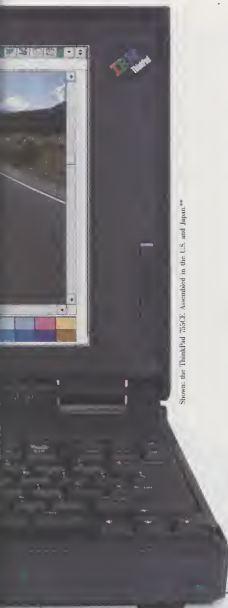
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The PC

MAGICAL MYSTERY BOXES

Roll up! Roll up for the Digital Mystery Tour. Step right this way. We've got your electronic stereoscopic ViewMaster-in-monitor, we got your game machines, we got your proto-Arnold Palmer practice putting green—and there's more in store, as gizmos, gadgets, and garishness collide with the PC paradigm. At January's Winter Consumer Electronics Show, Silicon Valley met Hollywood in Las Vegas. As the line dividing PCs and consumer devices of every kind—telephones, beepers, pagers, and games—evaporates, the gizmos are getting smarter and the PCs are getting new novice-friendly interfaces.

It only costs a buck or two to buy a watch that keeps accurate time. But most of us think nothing of plunking down \$50 or more for a new wristwatch. The extra cash might get you an extra feature or two—and slightly higher precision than a \$1.99 Wal-Mart special. But let's be honest. You're usually buying a fashion statement.

But a watch that only tells time, however stylishly, is passé in the high-tech '90s. Today's hot tickets strap more functionality to your wrist than Dick Tracy could ever have imagined. Want a remote control for your TV? Casio's got you covered. How about a pager? Check out The Beep from Swatch. Download your appointments from Microsoft's Schedule+ with Timex's Data Link. Always misplacing your cordless phone? You'll need Microtalk's Tele-Watch, due out later this year.

Computer vendors haven't lost sight of the growing trend of cramming virtually every communication or computation

function into a single gizmo. But they're aiming to convince you to command and control your world from your desktop—instead of your wrist. Today's consumer-oriented PCs aren't content to manage your finances and churn out that annual Christmas newsletter. That beige box with a monitor on top might be a number cruncher. It might be your voice-mail system or a \$2,000 speakerphone. Maybe it's an interactive television with a 101-key remote control. Or it could be the baddest game machine your trigger-happy teenager ever exterminated bad guys with.

And if you doubt for a clock cycle that the



Gets Personal

retail channel views the PC as its own personal cash cow, take a look at the bellwether of consumer purchasing, the Consumer Electronics Show.

The range of exhibits says it all. Angling for floor space amidst show cars sporting stereo systems that can vaporize a stop sign from two blocks away—or the bewildering array of telephones shaped like fish, ducks, and spacecraft—are consumer-oriented PCs, ergonomic keyboards, house-shaped mice, and thousands of multimedia CD-ROM titles.

Bobbing for Dollars Perhaps the most egregious example of pandering to the mass market in computing is Microsoft's latest operating environment: Bob. Good ol' Bob is more than just a pretty interface—it's 12 cartoon animals that alternately annoy you and get under your skin. The little critters are part of some reverse Darwinian social interface, whereby the menu and button world that gets things done quicker gives way to hyperactive beasts that smile knowingly at you as you compute.

Microsoft hopes you'll soon find this bobnoxiousness on every off-the-shelf home system you buy at major retailers. But other PC makers targeting the consumer market will provide some alternatives. Most vendors with product lines geared for the home—like Acer America, Compaq Computer, Packard Bell, Apple Computer, and Everex Systems—have their own user-friendly operating system shells. Shells that, thankfully, don't involve the animal kingdom. And they're applying cosmetic touches to their hardware as well. Packard Bell, for example, offers optional color panels to help its beige boxes fit your decor. And they've even taken a cue from Steve Jobs's sleek Next workstations—or was it Henry Ford's sleek Model T?—and will offer PCs in basic black.

War Games It's hard to tell which has had a greater impact on the computer industry: the military or arcade games. The military has long been the lifeline of Silicon Valley, pumping funds into research

and promoting development and innovation such as the satellite-based Global Positioning System, which you can now use in your car for \$300 and up.

Games, on the other hand, consistently drive you back to the stores for better, faster multimedia machines. And the production values have increased a bit since the days of Pole Position and Tetris. Now, you'll see kick boxers that move more like Jean-Claude Van Damme than Fred Flintstone. And as often as not, you'll see video clips of faces you recognize—like actress Tia Carrere in Virgin Interactive Entertainment's *The Daedalus Encounter*, villain Malcolm McDowell in GTE Interactive's *Tank Girl*, and gravel-voiced Mufasa from Disney Interactive's *The Lion King*.

One thing's for sure: When movie spin-offs hit your CD-ROM drive before the movies reach your local video store, you know your platform has arrived in the consumer market.

BY Yael Li-Ron, Matthew Lake, and Jon Zilber



There's More to an Interface Than Icons...

In Your Face

The year was 1968. Moviegoers were introduced to HAL, the soft-spoken psychotic computer who needed nothing but plain-English commands to run a sophisticated spaceship. Meanwhile, in computer labs, teenagers destined to become the future leaders of the computer industry were carefully flipping switches on computer front panels and watching cryptic blinking lights for indication that their programs were running properly.

Human-computer interaction, according to the 1995 Consumer Electronics Show, is halfway between those two scenarios. The traditional keyboard-monitor setup of the 1980s is making room for new technologies, such as handwriting recognition, voice recognition, virtual reality, point-and-click operating environments, and, pardon the term, social interfaces.

MAKE IT SO Your PC doesn't really have to be dull, beige, and impersonal. You can get just as much productivity from it (if not more) by dressing it up and having fun with it. BrainWorks has a line of lively sets to cheer up any desktop: From Star Trek to The Flintstones, and even Nickelodeon, these colorful keyboard, monitor, and mouse sets can turn a lifeless cubicle into a command center.

Star Trek Accessories / BrainWorks / (800) 999-9989 / \$129.95 est. street price / Reader Service No. 722



POP-OUT CHARTS Another entry from the worlds of games and entertainment into the PC mainstream is this pair of 3-D glasses from Chinon America, which turns your screen into a regular, well, ViewMaster. With these glasses on, you just can't achieve a higher level of geekdom.

DeepSee / Chinon America / (800) 441-0222, (310) 533-0274 / \$149 est. street price / Reader Service Number 723



LOST IN PARADISE There are only two acceptable ways to navigate your way through a foreign city: Stop and ask a gas-station attendant for directions or get yourself a GPS unit. Whether PC Card-based or placed on the dashboard and connected to your notebook's serial port, Trimble Navigation's Mobile GPS Intelligent Sensor 100 space-age navigator will take you anywhere. Even to the nearest gas station.

Mobile GPS Intelligent Sensor 100 / Trimble Navigation / (800) 827-8000 / \$395 est. street price / Reader Service No. 724

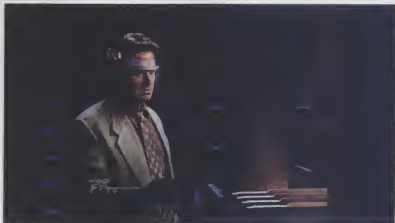
ODD CLUB OUT

Big Bertha, Spoon, Putter, or Space Bar—which one doesn't belong in your golf bag? For the longest time, playing PC-based golf meant hitting the space bar or a function key when you wanted to swing, but PC Golf by Sports Sciences lets you control your game with a real club. Hard-wired to your system, it lets you play golf next to your desk and not just daydream about it. Golf isn't your bag? Other virtual reality controllers let you swat a real baseball bat, race a real Exercycle, or strum a virtual air guitar (like The Jaminator from Music Industries) all the way to rock-and-roll heaven.

PC Golf / Sports Sciences / (216) 963-0660 / \$149 est. street price / Reader Service No. 725

The Jaminator / Music Industries Corp. / (516) 352-4110 / \$139 est. street price / Reader Service No. 726

VRy NICE If you think virtual reality is just an arcade game novelty, think again. The same technology that lets you simulate flying an airplane or shooting bad guys will eventually become a mainstream business tool. The "corridor" database from the movie *Disclosure* is not just a fantastic prospect. In the near future, you'll manipulate data in ways even Hollywood hasn't dreamed up.



Silicon Valley Meets Hollywood... But Will It Play in Peoria?

When Worlds Collide

Step right up folks, gather 'round. I have here for your purchasing pleasure a miracle of modern technology. It slices, it dices, it juliennes. It's a dessert topping and a floor wax. This is not your father's IBM. This is the consumer electronics Swiss Army knife, the super DOS-o-matic, a Pentium-powered wonder for the 1990.99878s.

We've got your basic computing power—it recalcs, it word processes, it jacks into cyberspace. We've got your multimedia—it plays Doom and Disney in 16-bit sound and 24-bit color. We've got your bona fide "Intel Inside" sticker. Put away your money, madam, there's more, much more. It's a television. It's an answering machine. It's a speakerphone. It's a stereo system. Now how much would you pay to have this in your home...?



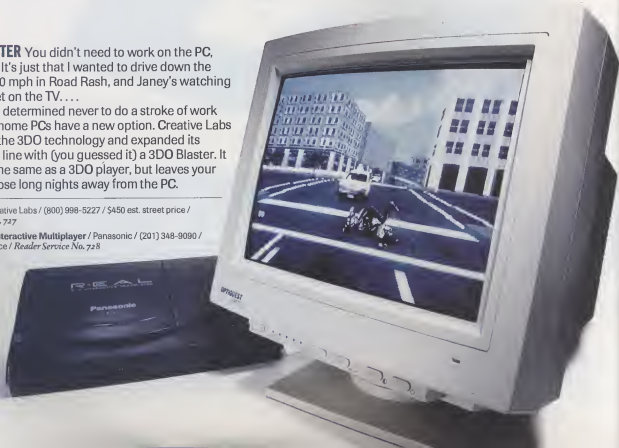
CDs 'R' US It's silver, circular, and measures 5.25 inches across. It's a compact disc—but is it Mac format? PC? Audio CD? Chances are, it's all of the above. Increasing numbers of CD-ROM titles are hybrid Mac and PC format—despite resistance from the retail community, which claims it confuses buyers. And a new hybrid audio/CD-ROM format interleaves sound and data tracks to avoid that ear-splitting squawk when you play a CD-ROM on an audio CD player.

FASTER BLASTER You didn't need to work on the PC, did you Dad? It's just that I wanted to drive down the freeway at 110 mph in Road Rash, and Janey's watching Sesame Street on the TV....

Those of us determined never to do a stroke of work again on our home PCs have a new option. Creative Labs has licensed the 3DO technology and expanded its Blaster board line with (you guessed it) a 3DO Blaster. It costs about the same as a 3DO player, but leaves your TV free for those long nights away from the PC.

3DO Blaster / Creative Labs / (800) 998-5227 / \$450 est. street price / Reader Service No. 727

FZ-1 Real 3DO Interactive Multiplayer / Panasonic / (201) 348-8080 / \$399 est. street price / Reader Service No. 728





THE 57-CHANNEL TELEPHONE Excuse me while I hang up the PC. OK, I'm ready now. Let's channel surf the PC instead. The computer industry has finally picked up something that the television industry has known since the 1950s—the screen and speakers belong together. And they added a new spin: an answering machine and speakerphone. Compaq's Presario (at left), Packard Bell's Spectria, and IBM's Aptiva product lines throw everything they can find into the beige box and price them to move.

Presario CDS 520 / Compaq Computer Corp. / (800) 345-1518 / \$1,499 est. street price / Reader Service No. 730

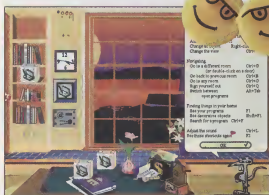
Spectria / Packard Bell / (800) 733-5858 / from \$1,400 est. street price / Reader Service No. 731

Aptiva / IBM PC Direct / (800) 426-7255 / from \$1,300 est. street price / Reader Service No. 732

SPIN-OFF CITY Carmen Sandiego started out as a game and became a TV series. That was the beginning. Now blockbuster movies like *The Lion King* and *The Pagemaster* hit the CD-ROM charts six months or more before the video hits the rental counter (for a limited time only and for the last time this century). And the software company that's developing the *Tank Girl* game (GTE Interactive) is adding footage of Malcolm McDowell and co-stars that isn't even in the movie.

The Lion King / Disney Interactive / (800) 688-1520 / \$29.95 est. street price / Reader Service No. 733

The Pagemaster / Turner Interactive / (800) 294-0022 / \$50 est. street price / Reader Service No. 734



COMPUTERDOM AND DUMBER Just when we thought that interface design was bob-bob-bobbing along in the direction of Windows 95 (that is, a Mac workalike with two mouse buttons), Microsoft threw a curve ball called Bob. Here's the future of the interface: A help system in the form of speech bubbles from a dog. Or a rat. Or a dinosaur. Well, at least it's not a purple singing one. Yet.

Bob / Microsoft / (800) 426-9400 / \$99 est. street price / Reader Service No. 739



Crossroads

Ethernet vs. Token Ring: An

BY MATTHEW LAKE

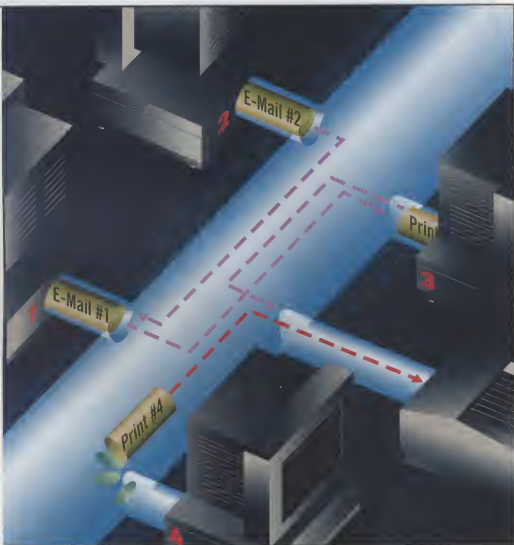
Ethernet: This bus network topology carries multiple instructions of variable lengths along with control information whenever a network node sends data.

Pros

- It tends to be cheaper on all fronts, including cabling and network interface cards—and there's no need for multistation access units (MAUs).
- Ethernet is optimized for low network saturation.

Cons

- Ethernet gets bogged down by high data saturation on the network.
- Upgrading to 100Mbps Ethernet is prohibitively expensive, involving reconfiguring switches and hubs, and installing pricey new interface cards.



Verdict



Ethernet Has the Vote: Ethernet already

dominates, and will continue to do so, according to the experts we interviewed. The reasons are populist ones: It's cheaper and easier to configure. It's faster at low-volume work. It comes in two coaxial wiring configurations—thin (5mm)

and thick (10mm)—that range from 1,000 feet to 3,300 feet between nodes. And unlike Token Ring, it doesn't have to be configured with MAU stations. It's not the best technology, but that's unlikely to become a serious obstacle to most users.

The Buzz

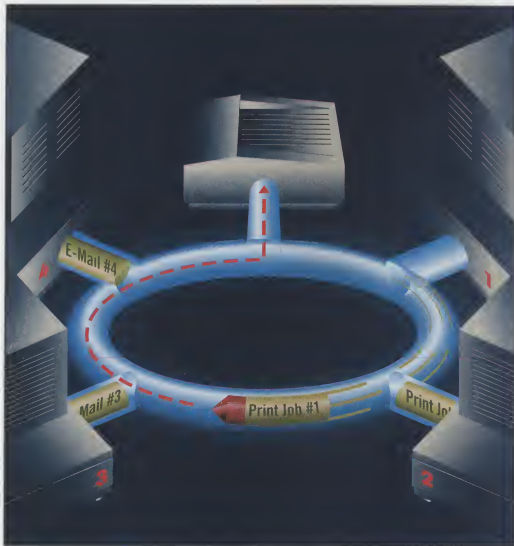


No Contest: Ethernet appears to have runaway acceptance in the market: 86 percent of the industry watchdogs we surveyed view it as the favorite. But there's some dissent over whether Ethernet deserves its leading position—many respondents concede that Token Ring is the superior

technology for busy networks (especially those operating at 60 to 80 percent of their total bandwidth). The problems that hamper acceptance of Token Ring revolve around cost and configuration issues rather than intrinsic merit. Being technically superior just isn't enough.

Inexpensive Solution, or a Faster Topology for High Data Saturation?

ILLUSTRATION BY TIMOTHY EDWARD DOWNS



Token Ring:

IBM-developed Token Ring networks send a high-speed token that checks in at each node and regulates access to network bandwidth.

Pros

- At high network saturation, Token Ring operates faster than Ethernet.
- Tight integration with IBM-based networks makes Token Ring a good solution for IBM machines.

Cons

- Configuring Token Ring systems can be complicated.
- Market share is small compared to Ethernet, and rate of growth is slower.
- Token Ring costs more to implement than does Ethernet.

Timetable



Maintaining A Leading Position: Ethernet's dominant presence in the market will continue for the rest of 1995 with the introduction of high-speed 100Mbps Ethernet solutions—which theoretically outpace Token Ring's top rate by ten times (though that won't always

be true in real-world applications). Token Ring will not die on the vine, however. It's still a great choice for consistently high-volume network transactions, and its installed base is unlikely to change configurations, even with faster Ethernet coming down the pike.

Opinions

“ Ethernet's like a large family dinner with everyone asking for the salt at the same time. Token Ring is like being served by a really fast waiter who doesn't avoid your eye.

JOHN MONTGOMERY,
FEATURES EDITOR

Token Ring is a better architecture, but it's like Micro Channel—IBM didn't really open it up so it's not what everyone is working on. It's also very expensive.

JOHN TASCHEK,
TECHNICAL ANALYST

Ethernet has the momentum.
LARRY SMART,
PRESIDENT AND CEO,
MAXTOR

Help: Working Smarter

Dedicated to the Server You Love

How many PCs did you buy in the past year? Two? Twelve? Twenty? Odds are they all arrived with Windows for Workgroups 3.11 preinstalled. For those that didn't, the upgrade is well worth it, if only for the performance boost that comes with the new 32-bit disk cache. Once all of the machines in your office are up-to-date,

Windows-wise, it's time to consider adding a dedicated server to your Windows for Workgroups 3.11 network. "Wait a minute!" you protest. "Isn't Windows for Workgroups a peer-to-peer network?" Of course it is. But even in an office of two, there are plenty of reasons to press an otherwise obsolete PC into service as a server. It's not that expensive, and, unlike the routine on a typical peer-to-peer network, everyone gets to work at full speed—no matter what the person in the next cubicle is doing.

Put a big hard drive in the server, and you have a central repository for sharing and backing up crucial data files. Attach a

fast laser printer, and anyone can use it without slowing down their own PC's performance. Hook up a CD-ROM, and everyone gets access to useful data. And with a fax modem attached to the server's serial port, anyone can send and receive faxes anytime, without multiple fax lines.

Is this a substitute for a full-strength client-server network? Absolutely not. If you have mission-critical networking requirements, you'll still need the security and robustness of NetWare or Windows NT. But for simple sharing, a Windows for Workgroups server is cheap and versatile—and it can easily fit in with the big-time network solutions.

Dedicating one PC as a Windows for Workgroups 3.11 server is easy. Making it run at top speed is a little trickier. You don't need a superfast CPU—even a poky old 386 will do. But a fast disk drive is a must. If necessary, upgrade the hard drive to a speedy new IDE model. You can get a gigabyte-size drive like the Quantum Empire 1080 for well under \$700 these days; on a five-station network, that's like giving every user an instant 200MB storage boost. While the cover's off, you'll also need to add a network card. A 16-bit model should cost under \$100; 32-bit network cards are an expensive luxury that most mainstream networks don't need. Oh, and make sure there's at least 8MB of RAM installed. Follow these steps to make the most of your host:

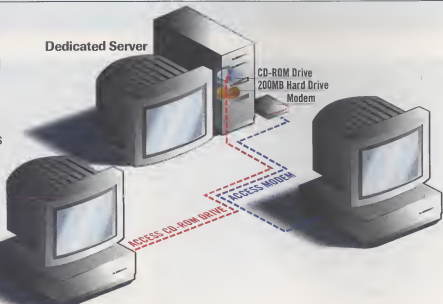
Tweak DOS If you plan to use a CD-ROM drive, you'll need MS-DOS version 6 or later to take advantage of SmartDrive 5.0's CD caching support. You'll also need to enable drive sharing by adding the /S switch at the end of the MSCDEX line in AUTOEXEC.BAT. If you

HOW IT WORKS

EASY RESOURCE SHARING ON A PEER-TO-PEER NETWORK

Contradiction in Terms?

A peer-to-peer network doesn't require a dedicated server, but if you set aside one system as a shared resource, you can save money on expensive devices such as printers, CD-ROM changers, and hard disks (for extra storage).





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ON OUR
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EXPERT TIPS SETTING UP A DEDICATED SERVER

Roll up Your Sleeves: It's going to take a little extra work to get your workgroup running right. Just follow these five simple steps to turn a default Windows for Workgroups 3.11 installation into a dedicated server.

- 1. Make sure you have enough PC.** You'll need at least 8MB of RAM, plus a fast hard drive that's big enough to handle your workgroup's storage needs. You don't need a fast CPU (a 386 is sufficient), nor anything more than plain-vanilla VGA and a bare-bones monitor. Of course, you'll need a network card to get the server connected.
- 2. Pick the right cache.** The 32-bit cache in Windows for Workgroups can handle all the hard disk access you can throw at it. To get there, open the Control Panel, click on the 386 Enhanced icon, and on Virtual Memory. You'll need SmartDrive only if you plan to share a CD-ROM. In that case, add the /S switch to the MSCDEX line in AUTOEXEC.BAT, and disable caching for hard drives by using the -drive switch after SMARTDRV (-C for most systems; -D, -E, and so on for multiple partitions).
- 3. Fine-tune Windows.** The default settings assume that a user will be running applications on the PC where Windows for Workgroups is installed. In the case of a dedicated server, this is not true. So optimize the shared resource settings to ignore applications and concentrate on the shared resources. Go to the Control Panel, click on the Network icon, click on the button labeled Performance Priority, and drag the slider to the far right (Resources Shared Fastest).
- 4. Keep the StartUp group lean and mean.** You'll need to put Print Manager into your StartUp group if you plan to share printers. Don't use a screen saver, though; for a dedicated server, the best screen saver is the monitor's power switch.
- 5. Pay attention to security.** Each time you share a drive, directory, printer, or fax modem, Windows for Workgroups lets you assign one or two passwords. If you'll have sensitive data on the server, use these passwords. And keep the server behind a locked door—anyone who can get to that PC can poke around on its hard drive without a password.

plan to use DoubleSpace on the server's hard drive, use MS-DOS 6.2 or later—earlier versions don't support 32-bit file access from within Windows for Workgroups 3.11. Create a directory called C:\TEMP and make sure that AUTOEXEC.BAT includes the line SET TEMP=C:\TEMP. (You'll use lots of that space for spooled print files.)

Set Aside a Cache Reserve Because this system will never be used as a workstation, you'll want to create a disk cache that's far larger than anything you'd ever consider using on a normal client PC. The exact settings will depend on whether you have a CD-ROM drive hooked up to the server, and on how much physical memory is present. Without a CD-ROM, the equation is easy: Don't use SmartDrive at all, set aside 4,096K (4MB) of RAM for Windows, and devote the rest to 32-bit file access. On an

8MB system, that means setting a cache size of 4,096K. With 16MB on the server, use a setting of 12,288K. (To get to the 32-bit File Access dialog box, open the Control Panel, click on the 386 Enhanced button, and then on the Virtual Memory button.)

With a CD-ROM installed, the cache equation gets a bit more convoluted. Because 32-bit file access doesn't work with CD-ROMs, you'll need to add SmartDrive support. For most uses, a value of 1MB to 2MB is appropriate. First, trim the 32-bit file access allocation by the size you plan to use for the CD-ROM cache. For example, to add a 2MB CD-ROM cache, subtract 2,048 from the 32-bit file access setting and add the line

C:\DOS\SMARTDRV 2048 2048

to your AUTOEXEC.BAT file. Make sure it

comes after the line that loads MSCDEX. And be sure to do this *after* you've reset 32-bit file access, because that Windows dialog box actually edits the SmartDrive statement in AUTOEXEC.BAT!

Bring Windows up to Speed Fine-tuning performance inside Windows means looking into a few nooks and crannies. First, open the Network Setup applet in the Network group and check the drivers for your network card. If they're not NDIS3 compatible, you're running in real mode . . . in other words, slow. Check with the card vendor for an updated 32-bit version. Failing that, try looking for the downloadable driver on the Microsoft Driver Library—modem access number: (206) 936-6735—or on CompuServe (GO MSLE).

Don't use a Windows screen saver. They tend to chew up CPU cycles like a squirrel working on a bag of nuts, and that's not what your network needs to keep running at peak efficiency.

To allow clients on the network to browse for shared resources, you'll need to add a line to SYSTEM.INI. Using a plain text editor like SYSEdit, move to the (network) section and add the entry Set MaintainServerList=Yes. The next time you start up your server, it will configure itself as a master browse server.

But the most crucial setting is buried under the Network icon in the Control Panel. Click on the innocent-looking button labeled Startup Settings, and you'll see a dialog box with a section for Performance Priority. Grab the slider and drag it all the way to the right, so it's flush against the words "Resources Shared Fastest."

Prepare to Share Congratulations! Your network server is now ready to use. You'll need to define shared directories, printers, and CD-ROMs before other network users can attach to them. Once you've done that, everyone on the network will have a range of capabilities they never before dreamed of. Here are some specific strategies you may want to employ, depending on the type of resource you're trying to share.

Printers Sharing a printer is ridiculously easy, as long as you remember to drag Print Manager into the StartUp group on the Windows for Workgroups server. Use the Share Printer As command (found under Print Manager's Printer menu) to give the printer a name, and make sure the box labeled Re-share at Startup is checked.



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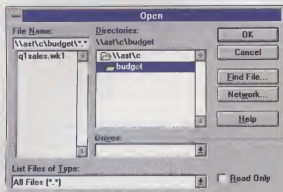
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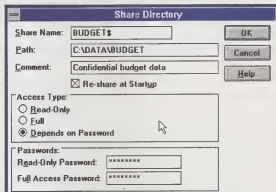
Client License Pak: BackOffice licensing simplifies client-server pricing. The client license pak includes one Client Access License for each of the five BackOffice server products—essentially licensing a single desktop to access any of the BackOffice server products on any server.

EXPERT TIPS

HOW TO ACCESS AND PROTECT SHARED RESOURCES



Better than Mapping: Bypass those clunky drive mappings and use UNC (Universal Naming Convention) identifiers. Like NetWare, Windows for Workgroups 3.11 supports UNC names, which consist of two backslashes, the name of the server (in this case, AST), the share name (in this case, simply C), and any additional subdirectories.



Secure Your Resources: To make shared resources harder to reach, add a dollar sign to the end of the name, and they won't show up when unauthorized network users browse through lists of available resources. Pointing and clicking isn't allowed with this type of resource; the only way to attach one is to type in its exact name.

To connect each workstation to the shared printer, choose Printer, Connect Network Printer from the remote system's Print Manager, then browse through the list of shared printers on the network.

If you're sharing a color printer that uses expensive consumables, you can restrict access to it by assigning the printer a password. To make it even harder for someone to inadvertently connect to that printer, give it a share name that ends in a dollar sign, like LASERJET4\$. Anyone on the net can still connect to it, but only if they type the name into the dialog box; it won't appear on browse lists.

Floppy Disk Drives One advantage of using an older machine for a workgroup server is that it probably has two floppy drives, unlike newer machines that ship with only a 3½-inch drive. Use Windows for Workgroups' File Manager to share the 5¼-inch floppy drive, and users will have an easy way to quickly read (and, if you choose, write to) that drive.

Hard Disks You can restrict remote users to specific directories on a shared hard drive, but you can't easily limit the space available to them. So an unthinking user can gobble up the entire disk and force you to play administrator. The workaround? Use Stacker, DoubleSpace, or DriveSpace to create multiple compressed volumes on the shared drive. You

can assign each user his or her own partition—and when they fill it up, they won't interfere with other users. As a bonus, you'll get extra storage space on the server.

Fax Modems To share a fax modem, first make sure it's attached to a local port on the server. Then use the Control Panel Fax icon to set up the modem for sharing. There's only one gotcha in the setup process: Make sure the server's shared fax directory is set up for read and write access, or users won't be able to attach to it.

CD-ROM Drives Sharing a CD-ROM drive is not really that different from sharing a hard drive. Leave the share settings at read-only, since you can't write to the drive, anyway. And test the CD-ROMs you plan to leave in the drive: Some, like Computer Select's stand-alone version, simply won't work across a network. Others will give you a polite error message if two users try to attach to the drive simultaneously.

If you want to give users access to multiple CD-ROMs, choose an inexpensive double-speed drive and daisy-chain a second drive (or a third or fourth one, for that matter) from the server's SCSI card. It's slightly more expensive than a CD jukebox, but for multiple users it's a more sensible solution.

No matter what resources you share using Windows for Workgroups 3.11, you're also ready for the next version of

Windows, because the networking features of Windows for Workgroups 3.11 are completely compatible with those found in Windows 95. When you decide to upgrade to Windows 95, you'll be able to do it one system at a time, or all at once, without disturbing your network or cutting productivity.

ED BOTT

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SHARING MODEMS

WINport 5.0

Windows for Workgroups users can now share modems just as they can all other resources, with help from WINport 5.0 by LANSource Technologies. WINport supports NetBIOS, IPX, and TCP/IP protocols. (Version 5.0 also supports Windows NT Server 3.5.) You can download the shareware version of it, WINPORT.ZIP, from data library 5 (Communications & Networking) of PC Contact (see page 284 for log-on instructions). Or call (800) 426-3475 to order the software on disk from Public Brand Software. You can also call LANSource directly at (800) 677-2727.

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Word to Live By—and Work By

Endless Automation No doubt about it: Microsoft Word 6.0 makes life easier. Nestled among a bunch of powerful features, you'll find numerous automated goodies. But automation pays off only when you know how to use it to your advantage. That's why Word also makes it easy to get these features to work the way you do.

If you've been a Word user for awhile, you probably drool over AutoCorrect. But don't settle for the default list that Microsoft provides. You can add your own common typos (see "Spelling Smarts," at right). And for added productivity, insert some abbreviations for frequently typed words or phrases—so that whenever you type "sd," the letters will be replaced with State Department, and so on.

Keep It Simple Word's layout makes most of its customization options available in one of two menu options: Tools, Options, or Tools, Customize. In either place, you'll find tabbed dialog boxes containing endless options that you can tailor to meet your every need.

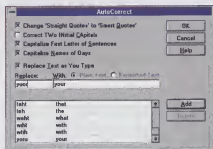
Like most Windows applications, a toolbar is a good first place to put that personal touch. Word makes it easy to drag features onto and off your toolbar, or to rearrange them the way you think they should be—not the way some programmer decided to organize them.

But you needn't stop with the toolbars. Don't quit until you've personalized all your icons, your menus, your templates, your keyboard....

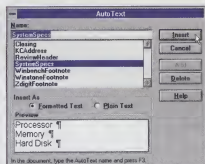
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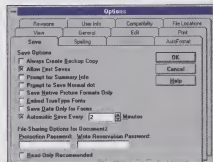
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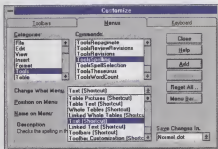
Spelling Smarts: Configure your AutoCorrect to fix your most frequent typos and spelling mistakes. Select Tools, AutoCorrect, and enter your common errors and correct spellings.



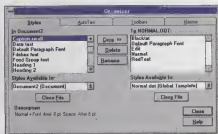
Easy Writing: Save boilerplate text as AutoText. Select the text you wish to save, then go to Edit, AutoText. Name your selection and add it to the list.



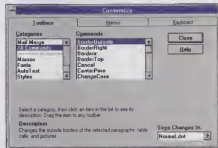
Available Options: The Tools, Options command offers a bevy of configuration choices. Under the Save tab, set up the Automatic Save option to save your documents frequently.



Right Away: Customize your right-click menus. From Tools, Customize, scroll down to shortcut menus. Now add any of your frequently used tasks—such as the spelling checker—to it.



In Style: Use Organizer to manage your styles (choose Format, Style, then click on Organizer). You can copy styles from one document or template to another with just a few easy clicks—ensuring consistency among your documents.



Tricky Toolbars: Don't forget to customize your toolbars. Under Tools, Customize, go to the Toolbars tab. You can then rearrange your toolbar's icons, drag icons off, or add any items you need by dragging them up from this menu.



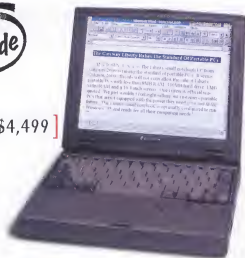
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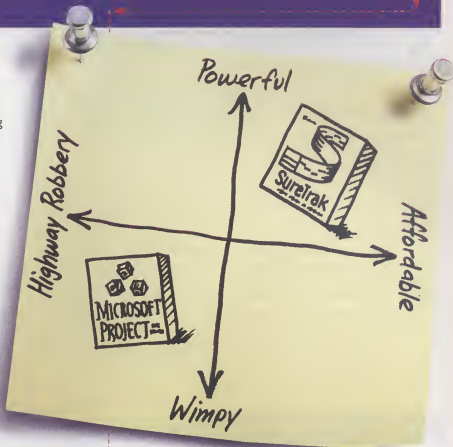
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Surely you don't think CD-ROM is an unjustifiable expense? With the thousands of business-oriented titles available for research and reference, it's hard to imagine an efficient office without one of these drives. If you're still skeptical, consider this: The most overlooked aspect of this technology is its huge storage capacity, which provides space

for online multimedia tutorials to be bundled with business applications.

Help files have had their day in the sun. The text-intensive approach is not appealing to the user. If you want to read, a manual will serve your needs. To take advantage of your computer's brainpower and multimedia capabilities, try an online video of an instructor showing you step-by-step instructions. Or look at a video capture of the sequence of menus and dialog boxes.

Our Usability Labs tested Lotus 1-2-3 for Windows Release 5, Multimedia Edition. This is the same Lotus 1-2-3 you get on floppy disks, but it includes a multimedia tutorial with animated screen captures, voice-over narration, and even a bouncy

tuxedo-clad cartoon man to point out areas of interest. The "movies" were created with Lotus ScreenCam, the nifty utility that creates stand-alone movie files for demonstrations and tutorials.

Our testers agreed unanimously: Multimedia was the way go. Their productivity and satisfaction were higher with that version than with the standard one. The best part is, the multimedia edition costs the same as the standard package (\$299 estimated street price). Some other products that come with online multimedia tutorials include:

- Quicken Deluxe 4 for Windows, featuring discussions of financial issues by notable experts (Jane Bryant Quinn and Marshall Loeb) in a talk-show format.

- Borland Paradox 5.0, which features "talking heads" video clips.

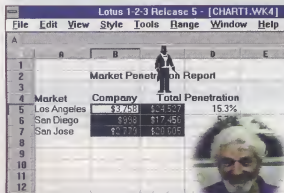
- Microsoft Works for Windows, the low-end integrated package that also has animated sequences.

Though the quality of some of these tutorials could be improved, they deserve praise for pioneering increased user productivity.

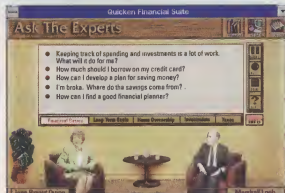
An ideal online multimedia tutorial would include animated screen sequences, the kind you'll find on the Lotus 1-2-3 CD-ROM. These movies should be context-sensitive, so that when you get stuck while attempting a task, the appropriate video clip can show you how to solve the problem. None of the products we looked at was context-sensitive, which is their main drawback. Future versions should also include voice-over narration and good branching capabilities. **Yael Li-Ron**

Borland Paradox 5.0 / \$399 / Borland Int'l. / (800) 233-2444 / Reader Service No. 738
Lotus 1-2-3 Release 5, Multimedia Edition / \$299 / Lotus Development / (800) 343-5414 / Reader Service No. 739
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Financial Advisors: The Quicken Deluxe 4 online video features experts discussing financial concepts, but it's not a tutorial for the program itself. Intuit prefers to teach you how to use the program using the printed manual and text-only online help.

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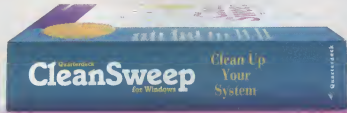
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We're sitting in the back of a plane headed to Comdex. Vince is in the aisle seat; Woody's at the window. Computer geeks everywhere. This guy walks up to our row, real slow like, tosses his guitar in the overhead compartment, grunts a bit, and slides in between us. Woody looks over at the tall, dark guy, his coal-black

sunglasses over a thick mustache and drawn face. "Excuse me," Woody says, ever the polite one. "Don't I know you?"

The guy takes a few seconds and looks Woody up and down. His voice comes back, thick as Atchafalaya mud. "Nope." That's all he says.

Woody starts shakin' like he's experienced the Second Coming, ya know, grabs the armrest so hard his knuckles turn white, mutters a few unprintable things, and says, "My God. Leon. Is that you?"

And this mysterious guy, he says nothin'. Everything goes quiet. Sweat beads up on Woody's forehead and his face turns red as he stammers, "Why would Leon Redbone be goin' to Comdex?"

So this guy breaks out a grin that creases his entire face, raises the mustache at both ends, raises his eyebrow and says, "Computers." That's all he says.

To make a long story short: This guy takes out his guitar and starts strummin' a few blues riffs. Magic. By the end of the flight, he, Vince, and Woody had cobbled together a song called "Demb VBA Blues." Sorry, we're out of space here, but the song is available on PC Contact (read on).

Who says nothing good ever comes out of Fall Comdex?

If you've been struggling with Visual Basic for Applications (VBA), Object Linking and Embedding (OLE), and Microsoft's anointed method for tying together Windows applications, OLE Automation, well, you aren't alone.

Lee Hudspeth and T.J. Lee have been wrestling with the daemon as well. They're putting together a book called *The Underground Guide to Office, OLE 2, and VBA* (Addison-Wesley), which should be available soon after you read

this. They've come to the conclusion that much of this Windows application glue stuff doesn't work, while the parts that *do* work don't work the way the documentation says they should. But when you finally put something together that *does* work, it's cool. Way, way cool.

Let's you think we're unbiased... not a chance! We're both deeply involved in the book. (Woody is Series Hack for the *Underground Guides* in general, and Vince is Tech Editor.) We've watched as Lee and T.J. have evolved from avowed OLE, VBA, and OLE Auto bigots to mere fans. They haven't yet arrived at the skeptic stage—Vince and Woody's level—but they probably will by the time they finish the book. You'll see.

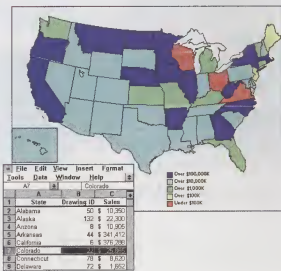
At first blush, it's hard to knock these

new technologies. OLE lets you embed one Windows application's document in another—put an Excel spreadsheet, say, into a Word for Windows document. Neat concept. But (as Lee and T.J. demonstrate repeatedly in the book) it's a big jump from concept to reality, and if you don't know where the mines are buried, you may step on a live one.

OLE Automation, as we explained in several *PC Computing* articles last year, is a way for one Windows application to pull the strings in another application. The application that's pulling the puppet strings is called a "client," and the one that's doing the client's bidding, the "server." In this month's application, Mapper, we'll be using Excel as an OLE Auto client and Shapeware's Visio as an OLE Auto server.

VBA is Microsoft's attempt to create a universal macro language for all of its Windows applications. It's a lofty goal, and while we believe that Microsoft will eventually be able to make the syntax and *some* of the commands similar across all the applications, we're still very skeptical that any pair of VBA dialects will realistically have much more than syntax and those few commands in common.

SNAPSHOT USING OLE AUTO TO COLOR BY NUMBERS

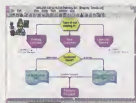


Aqua Marks the Spot: Need to quickly see which states have sales figures between \$10 million and \$100 million? Use OLE Auto to generate a color-coded map in Visio from a simple table in Excel, and Colorado gets the appropriate aqua shading, which corresponds to the legend below the map.



Tolstoy became infuriated whenever asked to edit or revise his work. Reminds us of someone using our competitors' flow charting software.

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SUPERSCRIPT HACKING VISIO OBJECT ID NUMBERS

Each state in Visio's picture of the United States has its own object ID number, but we couldn't find any Visio reference showing which state corresponds to which number. So we hacked it. This VBA program (run in Excel) loops through all the objects in Visio's United States picture. It makes each object red, one at a time—pausing to let you copy down its ID number before moving on to the next state.

```
Sub FindStateColors()  
    Dim appVisio As Object  
    Dim usObj As Object, shpsObj As Object  
    Dim rng As Object  
    Dim i As Integer  
    Dim oldFill As String  
  
    Set appVisio = GetObject(, "visio.application")  
    Set usObj = appVisio.Documents("us.vsd").Pages(1).Shapes("United States of America")  
    Set shpsObj = usObj.Shapes  
    Set rng = Sheets("Sheet1").Range("Sales")  
  
    For i = 1 To shpsObj.Count  
        oldFill = shpsObj(i).FillStyle  
        shpsObj(i).FillStyle = "Red fill"  
        If MsgBox("ID # " & i, vbOK + vbCancel) = vbCancel Then Exit For  
        shpsObj(i).FillStyle = oldFill  
    Next i  
End Sub
```

This month we're going to build a real, working VBA program called Mapper, which uses OLE Auto to let Excel control Visio. It's pretty slick—and it's mind-boggling that you can do so much with so little code.

The basic idea is pretty simple. There's a spreadsheet with a Sales entry for each of the 50 states (see "Snapshot: Using OLE Auto to Color by Numbers," page 188). You type in the sales data—or have it calculated from another part of the spreadsheet. Run the VBA program SetStateColors(), and Excel uses Visio to produce a color-coded map of the states, where the colors are conditional values corresponding to sales numbers. The whole Mapper program takes a few dozen lines.

You'll need Excel 5 or later, and Visio 3 or later. When you send in your Visio registration card, make sure you order the *Programming Visio* book for an extra \$29. And if you're going to be programming in Excel, by all means buy Microsoft Press' *Excel 5.0 Software Developer's Kit*—but if you want the whole story, you should also spring for the *Underground Guide to Excel 5.0 for Windows* and the aforementioned *Underground Guide to Office, OLE 2, and VBA*.

You can follow along here to create the picture, spreadsheet, and programs, or you can simply download MAPPER.ZIP from PC Contact, data library 6 (Tips, Macros, Batch Files). (See page 284 for information on logging onto PC Contact.) Unzip it, and pretend that you did all the hard work yourself. We won't tell.

Let's start with the Visio side—which is the OLE Auto server. Start Visio, click on File, New, and pick the Map Template. The map looks better if you turn the page sideways—landscape mode—so click on Page, Setup, and then on the Size/Scale... button. Pick Letter Wide (which is Visio's abysmal term for landscape). Bring up the U.S.A. stencil: Click on File, Open Stencil, and then choose States of the U.S.A. Stencil. Down at the bottom of the stencil, click and drag the United States of America shape into the drawing, and release it near the upper-left corner of the page. Click on the lower-right corner of the shape, and expand it to fill the whole page.

This next step is a real kludge, but we tried and tried and couldn't find any way around it: Ideally, each state in this "United States of America" shape should have a name—something to use in the

program to identify it, so we could change its color. No such luck.

Each object in a Visio drawing—in this case, each state—has an ID number. Since there are no names to work with, we're reduced to using object ID numbers to identify individual states. For reasons best known to Visio, this "United States of America" shape *bides* the IDs of all its components. Hoo-boy. We think it has something to do with the fact that it's a master shape—more a link to something in the stencil than anything else. There doesn't appear to be any way to get at the object IDs as long as the master shape is intact.

So we broke the master shape. Heh heh. Make sure the "United States of America" shape is selected, then hit Ctrl-U, to Ungroup the shape. (An interesting performance note: On our 33MHz 486, ungrouping the master shape took about five minutes; on our Pentium 90, it took less than a minute. Now *there's* an excuse for buying a Pentium...) Immediately after the master shape is ungrouped, hit Ctrl-G to regroup its components. Click on Format, Special, and type in United States of America as the name of the group.

Adding insult to injury, we had to write a program to step through all the object IDs in the shape and pull out the states' ID numbers. If you're curious about our sleuthing, check out "Superscript: Hacking Visio Object ID Numbers," above, left. So much for the kludge.

Click on File, Save, and save the file as, oh, US.VSD. If you put it in the subdirectory c:\visio\drawings, the VBA code in the demo here will run unchanged. That's it for Visio. You can close it down.

Next, let's put together the Excel worksheet. Start with a new spreadsheet, and add three column headings: State, Drawing ID, and Sales. Type in the names of the states in the first column, and their object ID numbers in the second column. (We don't have space here, so the State ID table is included in MAPPER.ZIP on PC Contact.) Leave the third column—the one that will ultimately contain sales figures, and will drive the Visio map—blank for now. Select all the data cells (that is, A2 through C51, excluding the heading cells A1, B1, and C1), and name the range Sales (Click on Insert, Name, then Define; type Sales; and click on OK).

To get the VBA program running, click on Insert, Macro, Module, and type in the code in "Superscript: The Mapper

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Application," at right. We wrote three programs that you might find useful. SetStateColors() updates the colors of each of the states in US.VSD to reflect the current sales numbers using the specified colors. ClearStateColors() behaves in a similar way, except it makes all of the states "clear," getting rid of any colors. Finally, SetRandomSales() is a little routine we used to test the program: It simply inserts random numbers into the Sales column of the spreadsheet.

Note that if you put US.VSD in a directory other than c:\visio\drawings, you'll have to modify the path references in SetStateColors() and ClearStateColors().

Click on File, Save, and give the Excel spreadsheet a name like MAPPER.XLS. To make everything work together, fill in the Sales column with your sales numbers; then select Tools, Macro, then SetStateColors(), and Run. And stand back. VBA and OLE Auto take over, cranking up Visio, bringing in the US.VSD drawing, and updating the colors in each state to reflect the sales figures.

Cool, eh?

Now, don't get too excited. VBA and/or OLE Auto and/or Excel and/or Visio can't yet pull off this kind of sophisticated interconnection shtick without a hitch. If you want to see something that's decidedly uncool, try running this program with SamSara on the screen. (Remember SamSara, our little free system resource monitor? It's discussed in three installments of our "Toolkit" column: October, page 222; November, page 256; and December page 278.) You can watch your level of FSRs drop, and never quite come all the way back.

For example, one of our Windows for Workgroups 3.11 machines started at 77 percent FSR. Starting Excel and opening the spreadsheet brought it down to 55 percent. Running the SetStateColors() program dipped the FSR to 44 percent. Closing Visio ran the FSR back up to 52 percent, and closing Excel only returned it to 70 percent. You may have much better luck on your system, but be sure to keep an eye on the FSR whenever you're running anything new and fancy like OLE Auto.

WOODY LEONHARD & VINCENT CHEN

Is OLE Auto ready for prime time? We aren't really sure, but we're the skeptics! Give us your opinion—right between the eyes—on PC Contact: Woody at 72241,2125, or Vince at 72241,2221.

SUPERSCRIPT THE MAPPER APPLICATION

Here are the three Excel VBA programs that drive Mapper:

Option Explicit

Sub SetStateColors()

Dim appVisio As Object

Dim usObj As Object, shpsObj As Object

Dim rng As Object

Dim i As Integer

Dim newFill As String

Set appVisio = CreateObject("visio.application")

appVisio.Documents.Open ("c:\visio\drawings\us.vsd")

Set usObj = appVisio.Documents("us.vsd").Pages(1).Shapes("United States of America")

Set shpsObj = usObj.Shapes

Set rng = Sheets("Sheet1").Range("Sales")

For i = 1 To 50

Select Case rng.Cells(i, 3)

Case Is > 100000

newFill = "Blue fill"

Case Is > 10000

newFill = "Cyan fill"

Case Is > 1000

newFill = "Green fill"

Case Is > 100

newFill = "Yellow fill"

Case Else

newFill = "Red fill"

End Select

shpsObj(Val(rng.Cells(i, 2))).FillStyle = newFill

Next i

Set appVisio = Nothing

End Sub

Sub ClearStateColors()

Dim appVisio As Object

Dim usObj As Object, shpsObj As Object

Dim rng As Object

Dim i As Integer

Set appVisio = CreateObject("visio.application")

appVisio.Documents.Open ("c:\visio\drawings\us.vsd")

Set usObj = appVisio.Documents("us.vsd").Pages(1).Shapes("United States of America")

Set shpsObj = usObj.Shapes

Set rng = Sheets("Sheet1").Range("Sales")

For i = 1 To 50

shpsObj(Val(rng.Cells(i, 2))).FillStyle = "No Style"

Next i

Set appVisio = Nothing

End Sub

Sub SetRandomSales()

Dim rng As Object

Dim i As Integer

Set rng = Sheets("Sheet1").Range("Sales")

For i = 1 To 50

rng.Cells(i, 3) = 50001 * (2 * Rnd) ^ 3

Next i

End Sub



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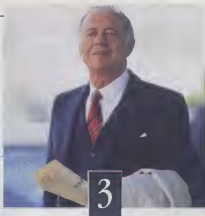
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OUR TECHNICAL STAFF RESPONDS

Questions, Answers, and Tips

Can't afford to purchase a new system, but seriously dubious about those chip upgrades? Feeling emotionally charged about electrical safety or about powering off without exiting Windows? We address these and other issues about DOS, Windows, and hardware, and share tips and tricks you can use in your favorite applications.

A CHIP OFF THE OLD BLOCK

Question: *I'm curious about the plug-in chips that upgrade a 286 to a 386, and now a 286 to a 486, for around \$270. Can one of these really deliver and make my old Packard Bell 286 work like new? Or is there something they're not telling me?*

GREG KOPP
INDIANAPOLIS, INDIANA

Answer: The answer is a definite maybe. The CPU upgrades we've seen do work and they are inexpensive. Provided, of course, that you don't mind opening up your age-old system, blowing the dust off the components, risking destroying your 10MB hard drive, and having to deal with a soldering iron to remove the old CPU.

In our August, 1994 issue, we reviewed the Cyrix Cx486DRx2 (see "Light a Fire under Your Old 386," page 56). This product plugs in to a 386 socket and promises something like 486 performance. The truth is that it is faster—up to 65 percent faster than the original machine. Our conclusion, however, was: Don't expect a 386 system to give you perfect 486 performance. But the upgrade is a whole lot cheaper than a new system.

The product you're talking about is probably Cyrix's 286-to-486 upgrade chip. We haven't tested this particular upgrade, but it's probably going to give you a similarly impressive performance boost. But don't think that you're converting your system to a true 486. A 286 has a 16-bit internal bus, and the upgrade won't change that. You won't

have a full 32-bit 486 system, but you'll be able to use Windows and take advantage of applications that require a minimum 386 processor.

All that said, you can probably purchase a brand-new 486SX or even a 486DX computer system for around \$1,000, and you can certainly get a new motherboard for much less than that. If you're willing to pop open the case on your hardware, a new motherboard may be a better solution—you'll get faster RAM, a new BIOS, and probably better system logic.

POWERLESS ON POWER DOWN

Question: *At my office there's an attitude that there's no need to exit Windows before powering off a*

computer. Aside from eventually stuffing a hard disk with orphaned TMP files, what harm will result from simply powering off?

K. A. BORISKIN
BELLINGHAM, MASSACHUSETTS

Answer: Closing Windows cleans up your hard disk. Not only does it delete TMP files, it also ensures that you don't have a problem with lost allocation units. A lost allocation unit occurs when an application reserves a chunk of disk space and then terminates abnormally. The file system thinks that the chunk is reserved for use by that program, but the program doesn't know anything about it (because it terminated abnormally). Since the file system thinks that the chunk is allocated, it takes away that space from you. You'll have to run CHKDSK /F or SCANDISK in order to free the lost allocation units.

Powering down in Windows can also cause cross-linked files. These are worse than lost allocation units because they cause your data to disappear. If an application (such as Windows itself) terminates

HOT TIP

SPLIT UP ACCESS OBJECTS FOR EFFICIENCY'S SAKE

Problem: I want to update and edit forms and reports in a Microsoft Access database file while still allowing others to work with the application.

Solution: By default, Access stores all its objects—tables, forms, reports, and queries—in one file with the extension MDB. You can split the data tables and the application into two files, one containing only data tables and another containing all your application objects.

To split an existing database, create a new, empty data file. Import all the tables from the original MDB file and delete them from the original. Then use the Access Attach Table command (under the File menu) to link the external data tables to the application file. Now you can work on forms and reports without risking your data. You can improve network performance by storing the data file on a server and allowing users to keep local copies of the application. And your backups of the smaller data-only file will go much more quickly.

ED BOTT
SENIOR CONTRIBUTING EDITOR

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Any way you look at it.

abnormally, it may be in the process of writing some data to disk. If it hasn't finished, it hasn't had time to tell the file system where it stopped. The result is that part of a sector is filled with your data, while the next part is filled with garbage. When you try to read your data, you get the garbage, too.

So the office's attitude is dead wrong. What's so hard about hitting Alt-F4 anyway?

A CLEAN SWEEP

Question: How do you show where the mines are hidden in Windows' Minesweeper game?

JOHN A. DIAGLIO
HOUSTON, TEXAS

Answer: Here's an Easter egg that should come in handy. Run Minesweeper, type XZZY and press Enter, then Shift. When you move the mouse pointer over the game, notice that whenever it's over a "safe" square, the pixel in the upper-left corner of the desktop turns white. (You may not be able to see this pixel unless you minimize your other applications and use a dark wallpaper.)

Here's a freebie: To make Minesweeper sound a siren when you lose (which you won't, thanks to the XZZY tip), go to the Windows directory and edit WINMINE.INI (if it's not there, create it). Go to the Minesweeper section (create it if it doesn't exist) and add the line Sound=10. Save the file, then start Minesweeper, and see what happens.

NETWORK WOES

Question: I'm having headaches figuring out this problem that even my system vendor can't solve. I get the error, "Out of memory, Memory allocation error, Cannot load COMMAND, system halted." And sometimes I get this one: "Cannot execute R:\PUBLIC\filename.EXE." I'm on a thin Ethernet network and we just extended its cable.

STEVEN GWEE SOON KIM
SINGAPORE

Answer: This is a good one. Just for the folks who didn't get the entire letter (namely, everybody but us), Steven included some more information about the systems and the network, including the NetWare system login script, and the workstations' CONFIG.SYS and AUTOEXEC.BAT files. These files enabled us to make a couple of educated guesses.

First, from your system login script, it seems that you're trying to load COMMAND.COM from your users'

login directories on the server. That's odd enough in itself (usually you load COMMAND.COM from a PUBLIC directory on your server), but in addition, your CONFIG.SYS file has a SHELL=C:\MSDOS\COMMAND.COM line. That's the culprit. Your system login script is telling the clients' workstations to look on the network for COMMAND.COM, and your CONFIG.SYS is telling them to look on their own hard disks.

If you have COMMAND.COM on your workstations, use that one. No

STEP BY STEP

DIALOG BOXES IN PROCOMM PLUS 2.0

Start a Dialog: Creating interactive scripts (ones that ask questions or display data) can seem intimidating, especially when you have to create a Windows dialog box. Fortunately, ProComm Plus 2.0 for Windows includes a friendly tool called the Dialog Editor for creating dialog boxes.

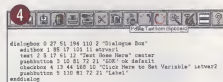
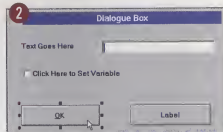
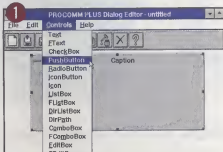
1. **Start:** From ProComm Plus 2.0, click on Tools, Dialog Editor. You'll see a blank frame. Add elements to the dialog box by using the Controls pull-down menu. Click on Controls, PushButton. Use the mouse to position the cursor where you want the push button to go, then click to paste one.

2. **Place:** You'll probably want to experiment with adding your own controls, dragging and sizing them as needed. The status line at the bottom of the screen (not shown here) displays the selected object's type, location, size, and identifier value. Use the location and size values to create well-placed push buttons for OK and Cancel.

3. **Customize:** Double-click on a push button. Change the Label field to OK. Check the Default box to make this button active by default. The ID field is the value that identifies this control to the script. Click on OK. Double-click on the other controls to customize them as well.

4. **Cut and Paste:** Once the dialog box is complete, click on File, Save As and save the file. Click on Edit, Copy Dialog. Now run ProComm Plus 2.0, and click on Tools, ASPECT Editor. Click on the Paste Text from clipboard button. The code for the dialog box will be pasted into the ASPECT script so you can edit it. Help contains a good example of how to display and control a dialog box. Click on Help, Search for Script Topic and search for pushbutton.

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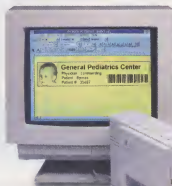
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matter what anybody says about the advantages of running DOS from a server, it still works best when you have one license per workstation and run it from the workstations.

So, change the COMSPEC line in your system login script so that it reads

COMSPEC=C:\COMMAND.COM

Now each workstation will look for COMMAND.COM on its own hard disk.

The second problem you might be having is that you've exceeded thin Ethernet's 100-meter limit. When you string more than 100 meters of thin Ethernet together without a repeater you can start to get some unpredictable results. It's possible that your workstations aren't getting a solid enough connection to load COMMAND.COM from the server without errant network packets messing things up.

Edited by JAMES OLIVER CURY.

Technical expertise provided by ED BOTT, VINCENT CHEN, RICK DOBSON, MARTY JEROME, MATTHEW LAKE, YAEI LI-RON, BRIAN LIVINGSTON, JOHN MONTGOMERY, SCOTT NAYLOR, JEFF PROSISE, and JOHN WALKENBACH.

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Help: Buying Smarter

A Paperless Office Is No Pulp Fiction

You're short-staffed and can't spare an employee for sorting, clipping, and filing all the incoming and outgoing paper. To put it simply, you're drowning in paper. Fortunately, technology offers a lifeline. Scanners, OCR, and document-management software are now good enough (and inexpensive enough) to be within the reach of

even the most cost-conscious companies. With document-management technology, you can have a faster and more versatile filing system than the old paper-based one.

The Process If you handle a lot of paper, it probably follows a workflow like this: Documents come in and somebody reads them and decides if they're worth saving. If they aren't, they go straight to the recycler. But if they are, they go to the filing room. Once they're in the filing room, someone has to decide how to file each document ("Should that be under the company name, or the name of the CEO?"), and then drop it into a file cabinet, where it's probably never going to be seen again.

This system is very person-time intensive—not so much on the front end, but on the back end, when you go to find a piece of paper. It's largely a problem of cross-indexing. Unless you're the Library of Congress, you probably don't have an indexing system for your file cabinets. Say you file a newspaper article on Buick under "General Motors." Now when you go to look up information on Buick, you have to know that it's been filed under the name of the parent company, General Motors, or you'll never find the document. Worse, you might waste hours trying.

Electronic document-management can solve some of these problems. When you're finished reading an article or letter, you scan it. Now you have an image of the document that you can manipulate electronically. First, you can archive the image, effectively filing the electronic piece of paper just as you would file a real one. But you can also use image-management software to cross-index the image by attaching

keywords to it. So you may "file" your article on Buick under "General Motors," but you can assign the keywords *Buick* and *GM* to it. In addition to (or instead of) attaching keywords, you can perform OCR on the document, then add the resulting text to a searchable database. In the best image-management systems, this recognized text will be automatically linked to

the original image, so you can see how the article looked on the newspaper page.

The process of scanning, recognizing, and indexing documents can consume many person-hours and may not seem worth it. That's because the time is saved on the back end—when you're looking for information on a given topic. By using image-management software, you have done away with the need for hunting through file cabinets. When you want information on Buick, you use a search engine to scan the database for occurrences of that name. You'll then see everything the electronic file cabinet has on Buick. It's fast and it's easy.

The Products There are hundreds of products that provide partial or complete solutions to the paper-management prob-

SITE ANALYSIS A DOCUMENT MANAGEMENT SYSTEM

The Problem The phone rings for the 20th time this morning. "What's going on with ERISA 404C regulations and the number of investments you can have?" "Hang on. Where the heck is that article? It was here a second ago. Here it is. Oops, it has coffee spilled all over it. Can I call you back?" "Never mind, I'll get the information from another investment firm."

And the client hangs up. Forever. The simple solution could be to ban coffee. But Greg A. Johnson, an investment executive at Kidder-Peabody & Company, has a better solution. "Our clients depend on us for quick access to information," says Johnson of his department, which consults with companies about implementing retirement plans. And if Johnson can't keep up, he loses business. The problem is paper. "We deal in very detailed, voluminous issues," says Johnson. And it's all in file cabinets and binders. Dozens, if not hundreds, of them. "We've got to be virtual specialists in each of those areas, which creates a challenge when we're trying to track and be on top of everything."

The Site Solution A Windows for Workgroups network, a fax server, and Caere's PageKeeper are providing the first ray of sunlight through this blizzard of paper. "Being able to say 'here's an article that has some very good information' and then fax it to our clients is very exciting," says Johnson. When he or someone in his group scans a document into PageKeeper, they apply OCR to it, then index and store it. Now, when Johnson wants information about a topic, he can just type in a few keywords. PageKeeper will choose the most relevant documents and bring them up on his screen in seconds. Instant expert. He's happy, and his clients are even happier.

lem, from million-dollar, do-it-all mainframe systems to \$50, limited-function PC-based text-searching software.

Affordable System An inexpensive solution is the \$349 PaperPort system from Visioneer Communications. The company's solution uses a single-sheet, serial-port scanner. The accompanying software lets you annotate files and search the annotations (similar to keyword searching). Although this program doesn't provide a native OCR application, it comes bundled with the popular Word-Scan OCR package from Caere.

If what you need isn't so much image management as transformation of loose data into searchable information, you're better off with a text database package such as Folio Views. A Views document is an infobase (a full-text indexed database). You dump raw text into the infobase, and the database engine can search for any word in the text. Lotus Notes is also capable of full-text indexing. The problem with these solutions is that you have to get the text into the database by scanning and performing OCR on it—so you still wind up paying for a scanner and OCR software, as well as for the text database.

Caere's PageKeeper offers another

exciting solution. This program manages both images and the text that goes with them. You take files (scanned pages, TIFF or PCX images, or even documents in a variety of formats) and pull them into a PageKeeper database. Then PageKeeper performs OCR on them and indexes all the resulting text. But unlike with full-text indexing, where every word is placed in the index, PageKeeper determines the topic of a document by looking for the three most frequently occurring words. It then indexes the document based on those words. When you search for a document, PageKeeper returns documents it thinks are relevant and estimates the odds that each document will contain the information you want. This technique is called *relevancy searching* or *weighted searching*.

At the high end of document-management systems are products such as Courtland Group's Ultra Plus-cold. Primarily

HIT LIST BURNING PAPER TRAILS

You may never go paperless—that goal is nearly impossible to achieve fully. But you should know the benefits and drawbacks of electronic document management.

1. Accessibility. You'll be able to locate magazine articles, press releases, memos, and anything else—in the blink of an eye—once the material is scanned and recognized.

2. Storage. Paper files can take up a lot of space—space for which you pay rent. A single magneto-optical cartridge can store about the same amount as a file cabinet.

3. Setup. Unfortunately, getting all those documents into your system can take a long time.

designed for archiving images at fairly large sites, Ultra Plus-cold keeps an image's recognized text right with the image itself. At \$8,495 for a single-user version, however, Ultra Plus-cold is not for everyone.

There are plenty of other products available to assist you in taming the paper tiger. None of them will eliminate all the paper in your office, but they will help you find information faster and more easily.

JOHN MONTGOMERY

HELPS FIND INFORMATION FASTER

Text and Pictures: Every scanned-in PageKeeper record contains both the image of the document and the complete text as recognized by OCR software. Enter a word in PageKeeper's Search dialog box, and the software finds each instance of that word in the database.

Best on Top: Before displaying the whole list of documents containing the keyword, the software ranks them based on both the number of times the word is used and its prominence in the document (for instance, whether it's in a heading or in a body sentence).

Caere's PageKeeper is more efficient than hit-and-miss, filing-cabinet trawling. Instead of delivering hundreds of randomly sorted documents, it puts those that are most likely to contain what you need at the top of the pile.

TEXT RETRIEVAL TECHNOLOGY

Desperately Seeking Digital Information

For those drowning in information, converting documents to electronic form is a lifeline. Previously cumbersome paper documents, faxes, and photos can be moved online and stored as ASCII text files and electronic images. However, this solution has also created a new challenge: We must now browse through the information

on our local PCs, file servers, CD-ROMs, and online services. We've traded in our mountains of paper for an electronic heap.

What you discover when you make the leap to electronic information management is that accessibility does not necessarily mean usability. Information with no cross-links or context sensitivity is nearly worthless. To be useful, raw information must be filtered and put into context.

Search-and-retrieval technology is beginning to catch up with recent improvements in information delivery. Today's information management must blend both new and traditional methods, so indexing and Boolean searches are combined with fuzzy matches and proximity searches. The ripest field for improvement is in the presentation of search results. Visualization metaphors and relevancy filtering have the potential to make postretrieval analysis easier.

You know that collecting electronic documents is easy—your hard drive is probably crammed with them. Unless the number of documents in your domain is relatively small, however, locating a specific document

can be a challenge. Paging through hundreds of megabytes of documents is neither fun nor easy. To speed up searches, documents need to be indexed.

An index is created when a user or program examines a document once and produces an abstract of it; the search software can then perform all searches on the abstract instead of on the full document.

Doing It Yourself Manual indexing means that *you* do the work. Most word processors provide simple document indexing, so that when you create a document you can add a separate abstract or document summary. Typical summaries include fields for the author's name, the subject, and keywords. Of these fields, the keyword entries are often the most important when you conduct searches. For example, assume that you want to abstract a memo about a lunch meeting with Joe Smith of Jones Company in which the two of you discussed his purchase of widgets. So you enter the following as keywords: *Smith, Jones Company, widget, purchase*. The more keywords you specify, the more

likely the correct document will turn up in a subsequent search.

The biggest problem with manual indexing is that it requires perfect foresight—you must know in advance every possible way in which you may search for the data. For example, in response to an audit of your business expenses, you'll need to retrieve a list of all your power lunches. However, because you didn't include *lunch* as a keyword in your abstract, you won't find that memo about Joe Smith.

Keyword searches are relatively fast. But complex documents contain too much information to be reduced to a few key phrases. Full-text indexing eliminates the need to generate the abstract manually and also makes searches more comprehensive.

Full-text indexing distills a document down to a list of its component parts—words and phrases—in a search-friendly format. These words may be sorted, classified by frequency of occurrence, or analyzed according to their context. Words that add little uniqueness to a document (pronouns and articles, for example)—known as *noise drop*, or *stop words*—are excluded.

Searching Documents The power of a document-management system lies in its ability to quickly pinpoint and retrieve documents that contain the information you require. The simplest search technique involves nothing more than creating a list of words you want to find and identifying all documents containing one or more of those keywords. Typically, finding a

What You See and What You Get:

If all you need is imaging software to keep track of your graphics alongside the scanned text, then inexpensive software such as Watermark Discovery or Caere's PageKeeper will do the trick.

If you plan to handle text, Folio Views offers full-text indexing and annotation features, while XSoft's Visual Recall goes a step further to offer relevancy ranking and bundled OCR.

PICKS

FIND A DOCUMENT-MANAGEMENT SOLUTION

1 What do you need to store?

ASCII Text

Text & Scanned Documents

Scanned Documents

2 What's the most important factor?

Sharing Documents

Relevancy Ranking

Relevancy Ranking

OLE Support

Full-Text Indexing

OLE Support

3 For your needs, the best product is...

Folio Views

XSoft Visual Recall

XSoft Visual Recall

XSoft Visual Recall

Caere PageKeeper

Watermark Discovery

Optical Character Recognition

Whenever you scan a paper document, all the scanner does is make a digital photocopy—a bit-mapped image of the words. To turn the bitmaps into usable text documents, you need optical character recognition (OCR) software. But don't expect perfect results.

1. Map Out the Page: Once your scanner or fax board delivers bitmaps of text to your OCR software, the program first maps out the page. It discards any obvious pictures, then figures out the baseline of each line of text on the page. Using nonlinear, neural-net techniques, it makes a best guess about the flow of text through the columns, then picks from a variety of techniques to figure out which letters and words the scan contains.

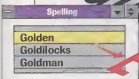
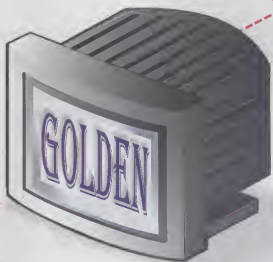
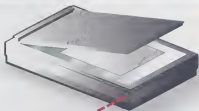
2. Find Matches: Matrix matching is the first, basic technique an OCR package uses. If the shape of a scanned character matches, more or less, one of the characters that the software has stored in a database, the software substitutes that character for the bitmap and moves on to the next scanned character. It flags unrecognized characters for other recognition techniques.

4. Figure the Context: Contextual substitution is used only when other techniques fail. If a scan is too faint or too dark to show a particular character clearly, the software might use a spelling checker to guess what the missing character is—then use matrix matching to back up its theory. Another contextual technique is based on the likelihood of one character following another (such as *u* following *q*).

3. Analyze Characters: On less-obvious characters, the OCR program uses a feature-extraction technique. This measures the geometric properties of a character—the angles of its lines and the elements that extend below the baseline or above the x-height. Then the software compares these properties to its own database of character properties and makes a best guess at the letter or number.

5. Mark the Problems: When the recognition is complete, OCR software saves the text as a file or drops it into your word processor or spreadsheet. If the software fails to recognize a character, it will be replaced by a # or @ symbol—these make the offending characters easy to spot.

BY MATTHEW LAKE



document containing a keyword is called a *hit*. A rare word may turn up only a few hits. An unselective search often results in information overload. I searched a database of computer publications for the term *search* and turned up 3,993 documents. Browsing these at a rate of 1 minute per document, you'd have to spend 66 hours. Clearly, when you search many documents, you need more restrictive search techniques.

Boolean Searches You can narrow your search by grouping two or more search terms, using the Boolean logic operators AND, OR, and NOT. Changing the previous example, to search for documents containing both the word *search* and the word *replace*, reduces the search result to 651 documents. Still too many hits. I finally narrowed the search to produce eight documents about search-and-replace operations on the PC, by using the following search expression:

search AND replace AND relevancy AND
full-text NOT apple NOT unix

Boolean searches have one major flaw: They can exclude relevant documents. Several documents that would have met my needs were excluded from the final search because they contained phrases such as *not available under Unix* or *apples and oranges*. These were unintended victims of the *NOT unix* and *NOT apple* Boolean terms.

Proximity searching is a more restrictive Boolean search that ties two words together, based on where they appear in a document relative to each other. For example, a proximity request for *search* within five words of *replace* would find *search* and *replace* as well as *search, then replace* and similar expressions. Occurrences of *search* and *replace* that are farther apart would be ignored.

Fuzzy Match When you work with text produced by an OCR system, or when you're unsure of the correct spelling, your Boolean searches may not yield the correct results. A fuzzy match will accept words as hits if they're close to the desired word, plus or minus a few characters. Another fuzzy match technique is *stemming*, which reduces words to their root form. Suffixes that indicate a plural noun (such as *-s* and *-es*) or verb tense (*-ed*) are removed from words. Not all words are easily stemmed. More advanced techniques may be used to further stem words, so a search for

explosives will find the words *explode*, *explosion*, and *exploded*. Similarly, a search for *mouse* will also return *mice*.

Relevancy Matching The explosion of online documents has created its own problem: Searching too large a domain—even with restrictive criteria—returns too many matches. A list of 1,000 document hits, sorted by date or title, represents accessibility without usability. Making productive use of these documents doesn't call for restrictive searches; instead, it requires rolling up your sleeves and sorting through the documents to find the information you're looking for. Both

PageKeeper and XSoft Visual Recall have additional code that analyzes the returned documents, categorizes them according to their relevancy, and presents them in an intuitive fashion (ranking the most relevant documents at the top).

With all of these solutions to choose from, the paperless office may be more attainable than you realize.

ROBERT L. HUMMEL is a contributing editor to PC Computing. He is also the author of *Programmer's Technical Reference: The Processor & Coprocessor* (ZD Press, 1992).

BUYER'S GUIDE TOOLS FOR TEXT RETRIEVAL

Rev Up the Search Engine: Let a text-search package make sense out of your raw text. Here are some of the best.

Product	Full-Text Indexing	Relevancy Ranking	Bundled OCR Support	OLE Support	Markup or Annotation	Estimated Street Price
askSam for Windows 2.0 askSam Systems (800) 800-1997 Reader Service No. 742				✓		\$140
Folio Views 3.1 Folio Corp. (800) 543-6546 Reader Service No. 743	✓			✓	✓	\$895
Lotus Notes Release 3.2 Lotus Development (800) 346-1305 Reader Service No. 744	✓	✓		✓	✓	\$495
PageKeeper 2.0 Caere (800) 535-7226 Reader Service No. 745	✓	✓	✓		✓	\$99
PaperPort Visioneer Communications (800) 787-7007 Reader Service No. 746					✓	\$349
Ultra Plus+cold Courtland Group (410) 730-7668 Reader Service No. 747					✓	\$8,495
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Circle 184 on reader service card.

DOCUMENT-MANAGEMENT SOLUTIONS

Office Minus Paper Equals Return on Investment

The document-management ROI decision pits people costs against technology costs. Filing is cheap, but retrieval is not. What can you do? Joe Officeworker earns at least \$35,000 a year, including benefits. That's about \$150 a day. So most of the document-management tools in this guide could pay for themselves in two to three weeks if

you could make Joe more productive. People are more expensive than technology.

The ROI analysis may be quite detailed, and may include hardware, software, systems integration, administration, workflow analysis, and training. ("Paperless Payback," below, ranks the cost and productivity benefits of these tools.)

Small-Job Help This is the low end of electronic document management. It includes scanners, optical character recognition (OCR) software, and document-management software. You select products after deciding what types of images you'll be using and how you'll store them.

Low-end products are generally suitable for individuals or small workgroups. They are distinguished from high-end products by their scale—and by their possible hidden costs. Consider the following: What happens to hard disk storage when you begin mass-producing images that are 60K each, even with compression? It may be time for a tape drive or a magneto-optical jukebox.

Think how amused the telecommunications people will be when you move huge files over the wide area network (WAN). You could bring the LAN to its knees.

And, of course, with your new imaging software, you really ought to have a color monitor—and make it a big one, at that. Speaking of big, forget the old 125MB hard drive. Maybe 500MB will do.

It's easy to see how document management can crater a technology budget. Also, you should consider whether a low-end product will scale up for a larger project—lest it end up in the closet.

Niche Help This is like kissing a German shepherd: For some people, it's magic; for others, it's a mouthful of hair. This

category includes text-searching software, entry-level scanning tools, and OCR.

I've been especially disappointed with handheld scanners. I spent \$500 for hardware and software and set about cleaning up my desk. I failed. Retyping documents myself was less time-consuming than scanning them. I dug a hole in the ground and buried the test equipment.

Big-Job Help This is high-end help, which includes workflow software—matching business problems with technical solutions—thus streamlining the business.

I'm working on an interesting project that fits the high end. It uses CD-ROM publishing. In early 1994, my company spent \$350,000 to create, print, and distribute 140 copies of an IS manual. I knew paper and printing were expensive, but this price tag was astounding—and it was

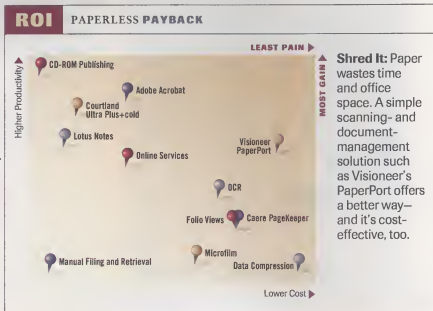
only one of 50 IS manuals we published.

Horried, I talked with the people using the manuals. They explained that they had to photocopy extra manuals because 140 weren't enough. And what about updates? Well, they simply stuffed the new pages in the back of the original book. What a deal! \$350,000, and the current system didn't work.

So I prototyped a CD-ROM version of one of the manuals, using Adobe's Acrobat software. Acrobat allowed me to convert documents to an all-purpose format for searching, editing, displaying, and printing. This was important, since each of my company's departments used different formats.

I've placed the first ten IS manuals on CD-ROM. The low cost of CD-ROM media makes it possible to distribute as many copies as the users want. Acrobat makes it possible to index the documents for rapid retrieval; this makes it possible to update electronic documents for peanuts—compared with paper. This is a rare IS project: Everybody is happy.

MARC DODGE, a telecommunications manager, is a regular contributor to PC Computing.



GUIDED CONTRAST

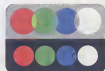
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ViewSonic's Super Contrast screen eliminates pixel crossover (top), providing distinct pixelization (bottom).

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SPEC WATCH Modems

Moving On Up Constant changes in standards and throughput make choosing a modem tougher than ever. In addition, you have to keep track of modulation, compression, error control, and fax specifications. Technical Director Adam Meyerson explains what these functions mean, how much speed you really need, and which features are essential for your business. **213**



Spec Watch Before your next hardware investment, check out our recommended specs:

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Direct to You ADVERTISERS' INDEX

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Spotlight on **Direct To You**

DTY Guest Commentary

This Month... **NECX**

Scott Randall, General Manager

Brian Marley, Director of Sales and Marketing

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Scott Randall and Brian Marley of NECX

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Direct to You **SPEC WATCH:** Don't Settle for Less than These Specs

V. THIS AND V. THAT—WHAT IT ALL MEANS

Modems: Fast, Faster, and Faster Yet

They're actually really simple. You start with your raw V.32 bis modulation (14.4Kbps), combine it with basic V.42 bis compression (which pumps you up to 57.6Kbps), throw in a little V.42 error control, and voilà! You're moving serious data. The International Telecommunications Union-Telecommunications Sector (ITU-T)

committee is constantly inventing cryptic new standards for your modem, and we'll start demystifying them here.

The latest standard, V.34, blasts right by 14.4Kbps and delivers 28.8Kbps—which, when compressed (using V.42 bis), pumps 115.2Kbps through your old phone lines. No special cable is required. So, once again the bar is raised and you're left pondering your next purchase. Don't fret. Follow these simple guidelines and you'll make your next modem decision

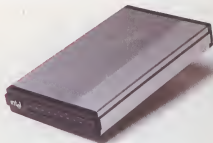
faster than you can download a 5MB file with a V.34 modem.

Whether you go for 14.4Kbps or opt for the big gun at 28.8Kbps, make sure your modem has V.42 bis compression, V.42 error control, and CCITT Group 3 fax capabilities. The 14.4Kbps spec offers excellent access to BBSs, e-mail, and small-to-medium file downloads. And since most of the installed base of fax machines runs at only 9,600 bps, you're safe there as well. But anything less than a 14.4Kbps modem

would be a waste of your time and money.

If your telecommunications plans include remote access, large downloads, or Internet access, you should opt for a 28.8Kbps (V.34) modem. However, for the near future, the only way to guarantee that you're taking advantage of this standard's maximum speed potential is to control both ends of the transmission. Put a V.34 at your home base, equip your road warriors with PC Card versions of the same, and your modems will pay for themselves in no time. And with mainstream online services offering Internet access, look for 28.8Kbps to quickly become the standard. Of course, V.34 is backward compatible, so you can always talk with all the other V's out there, too. If you bought into the spec early, and went for V.FC (fast class), then now is the time to cash in on all the promises that modem vendors made for easy upgrades to V.34. **ADAM MEYERSON**

MODEMS WHEN IN DOUBT, GET THE FASTEST YOU CAN FIND



USABILITY

- A. Display: LCD on external models.
- B. Compatibility: Fallback transmission rates.
- C. Compatibility: Windows software with support for Zmodem, Ymodem, Xmodem, Kermit. Built-in scripts for CompuServe, MCI. Support for phone cards.
- D. Setup: Software setup on internal modems (no jumpers).
- E. Support: Fax supports OCR.

FEATURES

- 1. Compatibility: V.32 bis, V.42 bis, V.42, CCITT Group 3 Class 1 and 2, Hayes command set.
- 2. Compatibility: V.34.
- 3. Audio: Integrated voice, data, and fax.
- 4. DSP: Onboard digital signal processor.
- 5. Speed: 16550 UART on internal modems.

DECISION MAKER

1 What's more important?	2 What will you use it for?	3 This is a minimum configuration:	4 Look for these features...
Download & Upload Files	Files Smaller than 500K	14.4Kbps with Fax	Usability: A, B, C, D, E Features: 1, 4, 5
	Files Larger than 500K	28.8Kbps (V.34) with Fax	Usability: A, B, C, D, E Features: 1, 2, 3, 4, 5
Work Online	Online Service	14.4Kbps with Fax	Usability: A, B, C, D, E Features: 1, 4
	Remote Access	28.8Kbps (V.34) with Fax	Usability: A, B, C, D, E Features: 1, 2, 3, 4, 5

CD-ROM DRIVES

DEMAND DUAL- OR QUAD-SPEED AND **MPC 2** COMPATIBILITY



USABILITY

- A. Door Cover:** Double doors on drive to deter dust.
- B. Control:** Audio output jack and manual volume control.
- C. Installation:** IRQs set through software, not jumpers or dip switches.

FEATURES

- 1. Performance:** 200ms access

time or faster.

- 2. Interface:** SCSI-2.
- 3. Buffer:** 64K or larger.
- 4. Buffer:** 256K or larger.
- 5. Compatibility:** MPC 2.
- 6. Compatibility:** High Sierra and ISO-9660.
- 7. Compatibility:** CD-Audio and Kodak Photo CD.
- 8. Applications:** Bundled CDs.

DECISION MAKER

1 Where will you use it?	2 For what purpose?	3 This is a minimum configuration?	4 Look for these features.
Multimedia	5 or More Commercial Titles	Quad-speed Drive with 150Kbps to 600Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
Text & Static Images	5 or More Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8

PORTABLE PCs

AT LESS THAN SEVEN POUNDS, **COLOR RULES**



USABILITY

- A. Display:** 9.5-inch active-matrix or dual-scan passive-matrix color display.
- B. Display:** 7.5-inch or larger dual-scan passive- or active-matrix color display.
- C. Weight:** Total traveling weight less than 12 pounds.
- D. Weight:** Total traveling weight less than 7 pounds.
- E. Key Spacing:** Cursor controls and function keys at least half the size of QWERTY keys.
- F. Batteries:** Swappable without powering down.

- G. Battery Life:** At least 4 hours with power management set at half mast.

FEATURES

- 1. RAM:** Expandable to at least 20MB.
- 2. Slots:** Two Type II PC Cards (or one Type III).
- 3. Slots:** At least one Type II PC Card.
- 4. Ports:** Serial, parallel, VGA, keyboard, and PS/2 mouse.
- 5. Sound:** Integrated sound chip.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration.	4 Look for these features.
Desktop Use	Multimedia, Application Development & Graphics	75MHz 0X4, 16MB of RAM, 500MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4, 5
	Word Processing & Spreadsheets	50MHz 486DX2, 8MB of RAM, 250MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
Traveling Machine	Presentations & Communications	50MHz 486DX2, 8MB of RAM, 170MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
	Word Processing, Spreadsheets & Databases	33MHz 486, 8MB of RAM, 120MB Hard Drive	Usability: B, C, E, F, G Features: 1, 2, 4

ETHERNET CARDS

PICK THE ONE THAT SERVES YOUR NETWORK NEEDS



USABILITY

- A. Software: Diagnostic utilities.
- B. PROM: Flash upgradable.
- C. Configuration: Through software (no jumpers or switches).
- D. Virus Protection: Integrated PROM.
- E. LEDs: Transmission and reception.

FEATURES

- 1. Drivers: NE2000-compatible.
- 2. Network Management: SNMP support.
- 3. Bus Mastering: Yes
- 4. Extra: Full-Duplex Ethernet support.
- 5. Cache/Buffer: 16K or larger.
- 6. Bus Support: PCI, VL, or EISA.
- 7. OS Support: NetWare, Windows NT, Windows for Workgroups, and OS/2.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration.	4 Look for these features...
Workstation	File Services	16-bit	Usability: A, B, C, D Features: 1, 2, 7
	Application Services	16-bit Bus Mastering	Usability: A, B, C, D Features: 1, 2, 5, 7
File Server	20 Nodes or Fewer	16-bit Bus Mastering	Usability: A, B, C, E Features: 1, 2, 3, 4, 5, 7
	More than 20 Nodes	32-bit Bus Mastering	Usability: A, B, C Features: 1, 2, 3, 4, 5, 7

NETWORK SERVERS

THE PENTIUM IS STANDARD EQUIPMENT FOR MOST SERVERS



USABILITY

- A. BIOS: Flash for easy upgrades.
- B. Enclosure: Tool-free removal.
- C. CPU Socket: ZIF.
- D. SIMMs: Easily accessible.
- E. Drive Bays: Easily accessible.

FEATURES

- 1. CPU Cache: Expandable to 1MB.
- 2. Upgrade Potential: Pentium upgradable.
- 3. Interface: Wide SCSI-2.

- 4. RAID: Level 3 or 5.
- 5. RAM: Expandable to 128MB.
- 6. Bus Slots: Eight EISA with two VL or PCI.
- 7. Internal Bays: Two full-height 5.25-inch, two 3.5-inch.
- 8. External Bays: Two half-height 5.25-inch with front-panel access.
- 9. Backup: DAT.
- 10. Network Card: One 16-bit.
- 11. Network Cards: Two 16-bit.
- 12. Protection: UPS.

DECISION MAKER

1 How big is your network?	2 Primary activity?	3 This is a minimum configuration.	4 Look for these features...
20 or Fewer Clients	File Storage	66MHz 486DX2, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 2, 5, 6, 7, 9, 10, 12
	Application Services	60MHz Pentium, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 9, 10, 12
21 or More Clients	File Storage	60MHz Pentium, 32MB of RAM, 2GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 9, 10, 12
	Application Services	90MHz Pentium, 64MB of RAM, 4GB Hard Disk, RAID Level 5	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 9, 10, 12

MONITORS

SELECT THE **RIGHT SIZE** FOR YOUR APPLICATIONS



USABILITY

- A. Controls: Front panel or onscreen digital.
- B. Power Management: EPA Energy Star.
- C. Base: Adjustable tilt and swivel.
- D. Input: Multiple input sources.
- E. Settings: Saved for different resolutions.

FEATURES

1. Emissions: MPR II.
2. Tube: Flat-square or Trinitron.
3. Controls: Microprocessor based.
4. Controls: Color.
5. Coating: Antiglare.
6. Vertical Refresh: At least 72Hz.
7. Vertical Refresh: At least 76Hz.
8. Vertical Refresh: At least 84Hz.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Text & Numbers	Word Processing & E-mail	15-inch, 800-by-600-Pixel Resolution, 0.28mm Dot Pitch	Usability: A, B, C, E Features: 1, 2, 3, 5, 6
	Spreadsheets & Databases	17-inch, 1,024-by-768-Pixel Resolution, 0.28mm Dot Pitch	Usability: A, B, C, D, E Features: 1, 2, 3, 5, 6
Graphics, Design & Multimedia	Presentation & Drawing	21-inch, 1,280-by-1,024-Pixel Resolution, 0.31mm Dot Pitch	Usability: A, B, C, D, E Features: 1, 2, 3, 5, 6
	CAD & Page Layout	21-inch, 1,280-by-1,024-Pixel Resolution, 0.31mm Dot Pitch	Usability: A, B, C, D, E Features: 1, 2, 3, 5, 6

GRAPHICS ACCELERATORS

GET YOURSELF A **VESA OR PCI BUS CARD**



USABILITY

- A. Software: For changing resolutions and colors.
- B. Software: For driver installation.
- C. Extra: Virtual desktop support.
- D. Jumpers and Switches: None.

FEATURES

1. Drivers: Windows 3.1.
2. Memory: Expandable to 2MB.
3. Memory: Expandable to 4MB.
4. Memory: Expandable to 6MB.
5. Vertical Refresh: 72Hz or higher at all resolutions.
6. Number of Colors: 64,000.
7. Number of Colors: 16.7 million (true color).
8. Feature Connector: VESA advanced feature connector (VAF) or VESA media channel (VMC) feature connector.
9. 3-D Support: OpenGL or other 3-D formats.
10. Resolution: 1,600 by 1,200 pixels at 16.7 million colors.
11. DRAM: 2MB minimum.
12. VRAM: 4MB minimum.

DECISION MAKER

1 What's more important?	2 What will you use it for?	3 This is a minimum configuration:	4 Look for these features...
Text & Numbers	Word Processing & E-mail	800-by-600-Pixel Resolution at 256 Colors	Usability: A, B, D Features: 1, 2, 5
	Spreadsheets & Databases	1,024-by-768-Pixel Resolution at 256 Colors	Usability: A, B, C, D Features: 1, 3, 5, 6, 11
Graphics	Design & Multimedia	1,024-by-768-Pixel Resolution, 64-bit Acceleration	Usability: A, B, D Features: 1, 2, 3, 5, 6, 11
	CAD & Image Editing	1,280-by-1,024-Pixel Resolution, 64-bit Acceleration	Usability: A, B, C, D Features: 1, 2, 3, 5, 6, 11

Sowing The Seeds Of Quality

UP TO
100
MHZ
PENTIUM



intel
inside
pentium

And Value

Let's talk about a place called Home... The place you'd rather be when you're stuck at the office... Where time flies by and every moment counts... Where compromise is king and majority rules... Where dreams are born and the sound of laughter never dies...

— O.K., we won't bore you with flowery phrases. But you've got to admit, your home is a pretty special place! So why settle for anything less from the computer you put in it?...

Water, Sunshine And A Whole Lotta Software...

That's how *our* garden of Home PCs grows. We start by pouring on the PCI — giving you the fastest information flow possible. Next we add hot Intel DX2™, Intel DX4™ and Pentium™ processors for blazing clock speeds and performance that cooks. Then, just as these systems are starting to sprout, we give them double- and quad-speed CD-ROM drives. And since we've got a green thumb for this multimedia thing, we also sprinkle each Home PC with some of your favorite Microsoft® software.

And While We're On The Subject...

Don't you just *love* software? All it takes is a little bit of the stuff to make an ordinary computer bloom into a prize-winning PC. If you think about it, software is almost like a fertilizer for your system... except it smells a lot better. So, what kind of software goes on our *Home* PCs? — We thought you'd never ask! The Microsoft Family Bundle is a veritable *bouquet* of interactive programs. You'll just *love* digging into CD-ROM titles like Encarta™, Works, Money, Scenes, Dangerous Creatures and Golf. But before you get your hands *too* dirty — check out some of the *other* goodies we've planted!

Enjoy Multimedia In Your Own Back Yard

It doesn't take long to realize that multimedia is deeply rooted in these Home PCs. In fact, depending on its configuration, your new power flower may be found "sprouting off" with a 32-voice wave-table sound card and Altec Lansing Speakers! Plus, every MidWest Micro Home PC features a 9624 or 14.4 fax modem with voice-mail that not only sends and receives at speeds up to 57,600 bps, but also acts as a personal answering machine — so you can keep the calls you *don't* want to miss... and weed out the ones you do!

It's time to pick a PC called Home... The place you'd rather be when you're stuck at the office... Where processors fly and every modem talks... Where you never have to compromise quality for a low price... Where imaginations are reborn and the sounds from your stereo speakers never die...



**MIDWEST
MICRO**

IT'S IN OUR NATURE

Systems

1-800-682-7248

Peripherals

1-800-445-2035

Spruce Up Your Working

23NDL
R.R.

BOOKSHELF

Microsoft ENCARTAS

glit

intel[®] inside
pentium[®]

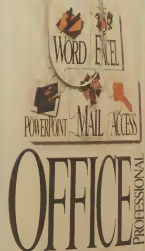
ENHANCED
IDE

Access faster
file transfer
Caviar
by WESTERN DIGITAL

"The Elite P590 is one of the fastest computers we've tested."
— PC World, January 1995

PC WORLD
TOP 20
Power Desktops

Environment With An Office PC



Let's face it, choosing a business computer is no picnic. That's why we offer a wide range of Office PCs with just the right tools for your business needs. And with one of these systems on your side of the fence, work may seem a little less like...work!

You Really Need To Get Out More...

And so you shall. Out of an "almost big enough" hard drive and into a roomy alternative. Out of your flimsy warranty program and into MidWest's Real 3 Year coverage. And *definitely* out of that "faster means too expensive" state of mind. We have no intentions of cramping your style. That's why we furnish our Office PCs with the biggest and best of absolutely everything! We're talking hard drive capacities up to 4.3 Gb, modem speeds up to 115,200 bps and enough business software to expand *anyone's* horizons! But before you think about expanding your *budget*, check out our down-to-earth PC prices.

Let's Skip The Formalities

You won't find any bugs in *these* high-performance systems. Every MidWest Micro Office PC features a 32-bit PCI Local Bus for sizzling video and peripheral output. And our *Pentium™* based Office PCs are *really* breaking new ground with 64-bit video accelerators, 75 MHz, 90 MHz and 100 MHz processors — even 16 Mb of RAM and up! Who says a serious business computer has to be stuffy?

Find A Shady Spot And Get Back To Work

We guess you could say with an Office PC, your possibilities are **wide open**. Just choose your processor, hard drive, etc. and have a little fun. If a change of scenery sounds good to *you*, don't let the grass grow under your feet — call MidWest Micro and order an Office PC today.



**MIDWEST
MICRO**

IT'S IN OUR NATURE

Systems

1-800-682-7248

Peripherals

1-800-445-2035

Sky-High Performance

No Strings Attached

New! PERSONAL
TouchPad
POINTING
DEVICE

Don't...Look...Down...

Why should you? *You're moving up* in this fast-paced world. You just need a notebook computer designed for more demanding altitudes. One with so many advanced features, it raises mobile computing to brand new heights. A portable that has no problem whatsoever with clock-tripling speeds up to 100 MHz! A notebook that when left without an outlet in sight replies, "Ten bucks says *you* run out of energy before *I* do."...Well it just so happens, we *have* such a notebook. We like to call it the SoundBook II.

Who Said Anything About The Sky Being The Limit?

We say there shouldn't be a limit to what your notebook computer can do! That's why we built the SoundBook II with plenty of ports, 16-bit stereo sound and lightning-fast Intel® processors up to DX4-100! Plus, two convenient RAM compartments make it a breeze to expand this SoundBook's 4 Mb memory to a lofty 36 Mb! And if you think *that* sounds cool, here's something that'll *really* blow your mind.

Winner: Most Congenial

Aside from this SoundBook's countless other talents, it also comes with Personality Modules. These compact peripherals pop in and out of the SoundBook II faster than you can say "My, how convenient!" Just plug your AC adapter or floppy drive into the SoundBook's universal drive bay, and say good-bye to bulky external components! Then choose from additional modules including a 3.5" CD-ROM drive, an extra hard drive and even an extra battery. Speaking of convenience, if tiny trackballs leave you at the end of your rope, you'll love this SoundBook's easy-to-use Personal TouchPad. With this touch-sensitive pointing device, your cursor will never get away from you again!...But your new *notebook* just might — at 6 lbs. the SoundBook II is our lightest SoundBook yet!

Look What Else Just Blew In

Also defying the laws of gravity and speed is the SoundBook Plus based on Intel's Pentium™ Processor. This MidWest favorite features 75 MHz and 90 MHz Pentium Processors coupled with PCI Local Bus Video and hard drive control. And since all our notebooks now come with a three year parts and labor warranty, you're guaranteed our highest level of coverage — no matter which SoundBook you choose. For the best notebooks at the lowest prices, all you need to do is look *up*...our toll-free number, that is. (And since we put it on every page, that shouldn't be too hard.) Call MidWest Micro today — then get ready to grab your new SoundBook and run!



**MIDWEST
MICRO**

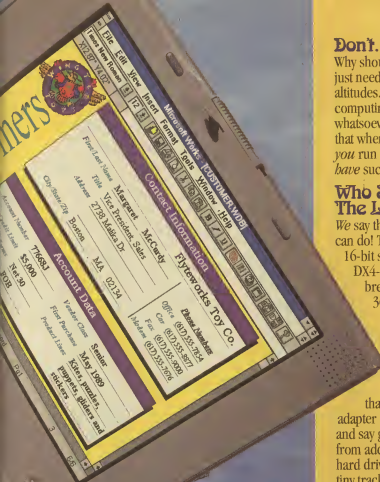
IT'S IN OUR NATURE
Systems

1-800-682-7248

Peripherals

1-800-445-2035

AD#M04



"...produced the highest Windstone
95 score of all reviewed systems."
— PC Magazine, January 1995



pentium

MidWest Micro Home PCs

DX2-50 \$1499 **DX4-100 \$1999** **P5-75 \$2299** **P5-90 \$2599**

#008740

- Intel® DX2™ 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Digital Quality Speakers
- 9624 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66

#008741

\$1599

#008703

- Intel® DX4™ 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Atec Lansing® Stereo Speakers
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX4-75

#008704

\$1899

#008742

- Intel® 75 MHz Pentium™ Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Atec Lansing Stereo Speakers
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-60

#008743

\$2199

#008744

- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI® MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
- Atec Lansing Stereo Speakers
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-100

#008745

\$2799

P5-100

#008709

- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
- Atec Lansing Stereo Speakers with Subwoofer
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 17" 28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-90

#008710

\$3199

PC

MAGAZINE

EDITORS' CHOICE

Dec & Jan, 1994

ATI Graphics Hardware

Perfected by PC

Energy

100% POLLUTION FREE

MidWest Micro Office PCs

DX2-50 PCI \$1199 **DX2-50 PCI \$1499** **DX4-75 PCI \$1799**

#008746

- Intel® DX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- 3.5" Disk Drive
- 14" SVGA, 28 N/A Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS® Works for Windows® 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI

#008747

\$1299

#008713

- Intel® DX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 9624 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf® '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI

#008714

\$1599

#008715

- Intel® DX4 75 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hiachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf® '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI

#008716

\$1749

DX4-100 PCI

#008717

\$1899



All Systems with a CD-ROM include TestDrive CD Software and Microsoft Home CD Sampler

MidWest Micro Office PCs (Continued)

DX4-100 PCI \$1999

- #008718
- IntelDX4 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

P5-75 \$1999

- #008748
- Intel 75 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- 15" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-60

#008749

\$1899

P5-75 \$2399

- #008750
- Intel 75 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-90 \$2499

- #008751
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 \$2999

- #008752
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 3.5" Disk Drive
- 15" SVGA, 28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 \$3399

- #008753
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with VoiceMail
- 3.5" Disk Drive
- 17" 28 Digital Color Monitor
- 0-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

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- ▶ Advanced Power Management
- ▶ One Parallel & One Serial Port
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- ▶ MS-DOS 6.22 & VFW 3.11
- ▶ Microsoft® Works for Windows 3.0 & Golf
- ▶ Lotus Organizer
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- ▶ Carrying Case
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PCMCIA 9624 Fax Modem	#001722 \$135
PCMCIA 14.4 Fax Modem	#002624 \$159
PCMCIA Combo Ethernet Adapter	#001954 \$139
Leather Carrying Case	#001515 \$ 99

Dual-Scan Color

P5-75 with 340 Mb HDD	#008090	\$2999
P5-90 with 340 Mb HDD	#008029	\$3299
P5-90 with 520 Mb HDD	#008025	\$3499
P5-90 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem	#008101	\$3999

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PCMCIA 14.4 Fax Modem	#002624	\$159
PCMCIA Combo Ethernet Adapter	#001954	\$139
Leather Carrying Case	#001515	\$ 99

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P5-75 with 340 Mb HDD	#008091	\$3999
P5-90 with 520 Mb HDD & 16 Mb of RAM	#008027	\$4799
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System Picture with tower case and 17" MAG monitor.



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- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem
- **Toshiba 4X CD-ROM Drive**
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- 11-Bay Mid-Tower Case
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*All Pentium systems come with 256KB cache, 486DX2/66, 486DX4/100 systems come with 128KB cache standard. Some software packaging may be cosmetically different than pictures shown. CD Titles do not include Manuals. On-Site Service may not be available in certain remote areas. All returned items must have a Return Merchandise Authorization (RMA) number and must be in original packaging. The cost for returned freight is not included with any Money-Back Guarantee; shipping charges are non-refundable. Due to volatility of prices, Quantex does not offer a price protection policy. Prices and product descriptions subject to change without notice. Quantex Microsystems cannot be responsible for errors in typesetting or photography. The Intel Inside Logo, Intel486, IntelDX2, and Pentium are trademarks of Intel Corporation. Some of the names or trademarks shown herein may be the property of other companies. Screen images simulated. Quantex 1995. All Rights Reserved.

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T2100	486DX2/50	9.5" Active	330MB	CALL
T2400	486DX2/50	9.5" Dual Scan	250MB	\$2469
T2400	486DX2/50	9.5" Dual Scan	320MB	2619
T2400	486DX2/50	8.4" Active	250MB	2359
T2400	486DX2/50	8.4" Active	320MB	3219
T2450CT	486DX4/75	9.5" Active	320MB	3969
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Model	Processor	Screen	Hard Drive	Price
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T4850	486DX4/75	10.4" Active	772MB	4829

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- ▲ 1 Type II and 1 Type III PCMCIA slots
- ▲ Accupoint integrated pointing device
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ MS-DOS 6.21, Windows for Workgroups 3.11, Windows Sound System 2.0, Indeo Video, and RunTime Video for Windows

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- ▲ Integrated pointing device
- ▲ 2 Type II or 1 Type III PCMCIA slot

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486DX2/50	9.5" Dual Scan	340MB	\$2549
486DX2/50	8.4" Active	455MB	3219
486DX4/75	9.5" Dual Scan	455MB	3399
486DX4/75	8.4" Active	340MB	4059
486DX4/75	8.4" Active	455MB	4249
486DX4/100	9.5" Active	525MB	4799

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MIDI/joystick port
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486DX/100	10.4" Dual Scan	340MB	\$4899
486DX/100	10.4" Dual Scan	540MB	\$5299
486DX/100	10.4" Dual Scan	810MB	\$5849
486DX/100	10.4" Active	340MB	\$6299
486DX/100	10.4" Active	540MB	\$6649
486DX/100	10.4" Active	810MB	7199
486DX/100	10.4" Active	540MB	7599*
486DX/100	10.4" Active	810MB	8149*

* Features built-in CD-ROM Drive



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Processor	Screen	Hard Drive	Price
486DX2/50	9.5" Dual Scan	340MB	\$3049
486DX2/50	9.5" Dual Scan	540MB	3449
486DX2/50	8.4" Active	340MB	3099
486DX2/50	8.4" Active	540MB	3449

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- ▲ 3-Year Warranty

Model	RAM	Hard Drive
486DX2/66	8MB	540MB
486DX2/66	4MB	540MB
486DX2/66	8MB	540MB
Pentium 75MHz	8MB	540MB
Pentium 75MHz	8MB	1GB
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Pentium 100MHz	8MB	1GB

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- ▲ Pan/Vision graphics for up to 1024x768 resolution
- ▲ 2 Type II or 1 Type III PCMCIA slot

Processor	Screen	Hard Drive	Price
486DX2/50	10.3" Dual Scan	340MB	\$2949
486DX4/75	10.3" Dual Scan	510MB	3439
486DX4/75	10.4" Active	510MB	4719
486DX4/75	10.4" Active	700MB	4999



Ascendia 910N

Ascendia 910N
10.4" Active
Matrix screen

Ascendia 810N

- ▲ LARGE, 10.4" Dual Scan displays
- ▲ 4MB RAM expandable to 20MB
- ▲ Removable hard drive and floppy drive
- ▲ 2 Type II or 1 Type III PCMCIA slot

Model	Screen	Hard Drive	Price
486DX2/66	10.4" Dual Scan	250MB	\$2399
486DX2/66	10.4" Dual Scan	340MB	2539
486DX2/66	10.4" Dual Scan	510MB	2689

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- ▲ Pentium upgradable
- ▲ Energy Star compliant
- ▲ MS DOS 6.0, Windows 3.1

Processor	RAM	Hard Drive	Price
486SX/33	4MB	270MB	\$1059
486SX/50	4MB	270MB	1169
486DX2/50	4MB	270MB	1379
486DX2/66	4MB	420MB	1499
486DX2/66	4MB	525MB	1639

COMPAQ monitors start at \$279.99

Contura 410

- ▲ 486DX2/50 processor
- ▲ 4MB RAM expandable to 20MB
- ▲ 2 Type I or 1 Type III PCMCIA slot
- ▲ Large built-in trackball
- ▲ MS-DOS, Windows 3.1, Tabworks, Lotus Organizer

Display	Hard Drive	Price
9.5" Dual Scan	350MB	\$2369
8.4" Active	350MB	2839

Business Lease: \$87/mo.

COMPAQ

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- ▲ 2 Type II or 1 Type III PCMCIA slot
- ▲ Integrated trackball
- ▲ MS-DOS 6.2, Windows 3.1, MS Video for Windows
- ▲ Run Time, Tabworks

Processor	Screen	Hard Drive	Price
486DX2/40	9.5" Dual Scan	170MB	\$2359
486DX2/40	8.4" Active	170MB	2829
486DX2/40	8.4" Active	340MB	3389
486DX2/50	9.5" Active	340MB	4439
486DX4/75	9.5" Active	340MB	4899
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486DX2/50	10.3" Dual Scan	340MB	3349
486DX2/50	10.3" Dual Scan	520MB	3729
486DX2/50	10.4" Active	340MB	4459
486DX2/50	10.4" Active	520MB	4839
486DX4/100	10.3" Dual Scan	340MB	4069
486DX4/100	10.3" Dual Scan	520MB	4449
486DX4/100	10.4" Active	340MB	5179
486DX4/100	10.4" Active	520MB	5559

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Processor	Screen	Hard Drive	Price
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486DX2/50	8.5" Dual Scan	260MB	2829
486DX4/75	8.5" Dual Scan	170 MB	3099
486DX4/75	8.5" Dual Scan	260MB	3379



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HP OmniBook 4000 Notebook PC

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Processor	Screen	Hard Drive	Price
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486DX2/50	9.5" Dual Scan	340MB	2499
486DX2/50	9.5" Active	250MB	2899
486DX2/50	9.5" Active	340MB	3029
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26642	-	11.00	24.00	45.00
26643	-	11.00	24.00	45.00
26644	-	11.00	24.00	45.00
26645	-	11.00	24.00	45.00

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Part	16K	32K	64K	128K
16641	1.00	1.00	1.00	1.00
16642	1.00	1.00	1.00	1.00
16643	1.00	1.00	1.00	1.00
16644	1.00	1.00	1.00	1.00
16645	1.00	1.00	1.00	1.00

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Part	80387	80387	80387	80387
80387	39.00	39.00	39.00	39.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00

AMBR				
Part	80387	80387	80387	80387
80387	39.00	39.00	39.00	39.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00
80387 (3 yr)	19.00	19.00	19.00	19.00

CYRIX DRX 386 to 486 Upgrade				
Part	386	486	386	486
386	19.00	19.00	19.00	19.00
486	19.00	19.00	19.00	19.00
386 (3 yr)	19.00	19.00	19.00	19.00
486 (3 yr)	19.00	19.00	19.00	19.00

SIMM Modules (Add \$5.00 for SIPP)				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

72 PIN SIMMS (EISA)				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

CYRIX FASMATH PROCESSOR				
Part	386	486	386	486
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486	19.00	19.00	19.00	19.00
386 (3 yr)	19.00	19.00	19.00	19.00
486 (3 yr)	19.00	19.00	19.00	19.00

AST MEMORY				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

ZENITH MEMORY MODULES				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

MAGNAVOX				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

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Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

BOCA AT PLUS				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

BOCA AT 8 BIT BUS				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

IBM P/52 32BIT EXPANSION BD.				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

P/52 MCA 0-8MEG EXPANSION BD.				
Part	16K	32K	64K	128K
16K	1.00	1.00	1.00	1.00
32K	1.00	1.00	1.00	1.00
64K	1.00	1.00	1.00	1.00
128K	1.00	1.00	1.00	1.00

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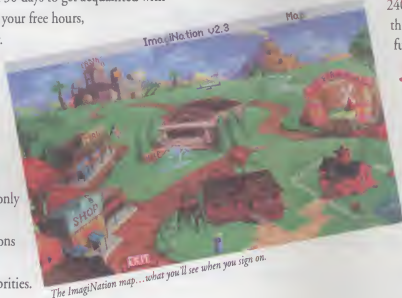
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256K CACHE



INTERNAL CD-ROM
(Optional)



TV TUNER MODULE
(Optional)



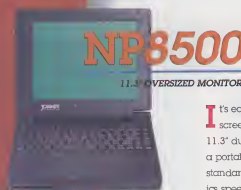
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11.3" OVERSIZED
DISPLAY



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DOUBLE LIFE
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256K CACHE



VESA LOCAL BUS VIDEO
& LOCAL BUS IDE



BUILT-IN
AUDIO SYSTEM



90MHz: PENTIUM POWER

NP7500

Pentium:

- 256KB Secondary Cache
- 8MB RAM Expandable to 40MB
- 16-bit Stereo Audio with 2 Stereo Speakers & 1 Microphone
- 1 16C550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support

486:

- 4MB RAM Expandable to 36MB
- Built-in Audio Chip with Speaker & Microphone
- 1 Serial & 1 Parallel Port
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- Removable 340MB Drive (250, 520, 810MB Optional)
- 3.5" 1.44MB Floppy Drive
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- Microsoft DOS 6.22
- Carrying Bag & AC/Adapter
- Weight 5.9lbs. with Battery
- 11.61" W x 9.64" D x 1.65" H
- Sager's Umbrella Protection Policy

NP7500 OPTIONS

Docking Station
Numeric keypad
Car Adapter
PCMCIA Cards
(Fax/Modem, Ethernet, SCSI & more)

NP8500

- 11.3" Dual Scan Color VGA Display
- CRT: 1024x768, 256 colors
- Intel Upgradeable 486 CPU
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NP8500 OPTIONS

Docking Station
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486DX4-100	\$1825	\$2245	\$2925	\$3175
NP8500	11.3" COLOR DUAL SCAN	9.5" MONO	10.3" COLOR DUAL SCAN	9.5" COLOR ACTIVE MATRIX
486SX-33	\$1995			
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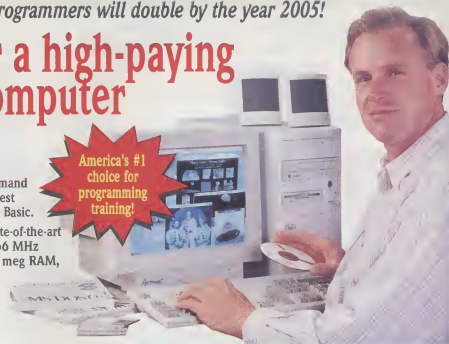
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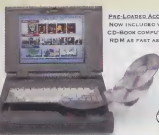


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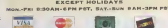
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4-Gig Conner	4326 \$959 \$1079
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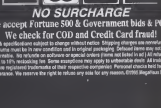
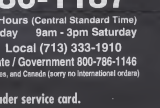
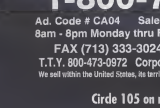
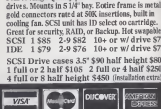
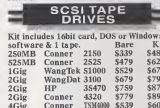
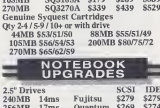
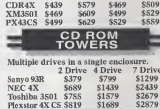
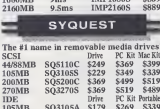
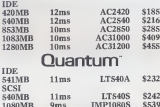
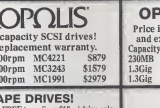
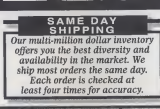
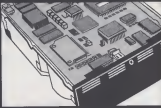
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Novell NLM 50 user / unlimited / 0502	\$49 \$199
Novell NLM 50 user / unlimited / 0502	\$49 \$199

	Novell NLM 50 user / unlimited / 0502
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Novell NLM 50 user / unlimited / 0502	\$49 \$199



1-800-786-1187

Ad. Code # CA04 Sales Hours (Central Standard Time)

8am - 8pm Monday thru Friday 9am - 3pm Saturday

FAX (714) 333-3024 Local (714) 333-1910

T.T.Y. 800-473-0972 Corporate / Government 800-786-1146

We sell within the United States, its territories, and Canada (sorry no international orders)

MEGAHAUS

HARD DRIVES

2201 Highway 517

Dickinson, Texas 77539

Circle 105 on reader service card.

NO SURCHARGE

We accept Fortune 500 & Government bids & POs

We check for C.O.D. and Credit Card fraud!

Prices & specifications are subject to change without notice. Shipping charges are not included.

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FYI

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Free Product Information

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 433 RIVERTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC Computing

P.O. BOX 11806
RIVERTON, NJ 08076-9406

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



PC Computing

FREE PRODUCT INFORMATION

Circle the numbers below corresponding to products featured in this issue's advertisements and listed in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

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Please answer questions below:

1. Where do you use your computer? (Check one only):

A. ☐ Home B. ☐ Business C. ☐ Both

2. What types of computers do you use? (Check all that apply):

D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible desktop F. ☐ MAC

(Check all that apply):

HARDWARE

G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Type Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE

Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility

Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/
Compiler
2. ☐ Integrated/Multifunction
3. ☐ CAD
4. ☐ CD-ROM

4. From which of the following sources do you purchase personal computer products?

(Check all that apply):
G. ☐ Specialty Computer Retail Stores
H. ☐ Mail Order Firms
I. ☐ Direct from Manufacturers
J. ☐ Other

PLEASE PRINT CLEARLY

PCG 4/95-4

Name

Title

Telephone

Company Name

Address

City

State

Zip

6. ☐ Please send me a one-year (12 issue) subscription to PC Computing for \$16.97 (U.S. price); all other countries add \$16.00 for additional postage

Circle the numbers below corresponding to the products featured in this issue's advertisements and listed in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

Valid after July 31, 1995

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Please answer questions below:

- Where do you use your computer? (Check one only):
☐ A. Home ☐ B. Business ☐ C. Both
- What kinds of computers do you use? (Check all that apply):
☐ D. IBM-Compatible Laptop ☐ F. MAC
- Do you plan to buy any of the hardware or software mentioned below in the next 12 months?
 (Check all that apply):

HARDWARE	SOFTWARE	Y. <input type="checkbox"/> Communications
<input type="checkbox"/> G. PC	<input type="checkbox"/> I. Accounting	<input type="checkbox"/> Z. Windows/Multi-tasking
<input type="checkbox"/> H. MAC	<input type="checkbox"/> R. Spreadsheet	<input type="checkbox"/> 1. Programming Language/Compiler
<input type="checkbox"/> I. Laptop	<input type="checkbox"/> S. Personal Finance	<input type="checkbox"/> 2. Integrated/Multi-function
<input type="checkbox"/> J. Printer	<input type="checkbox"/> T. Desktop Publishing	<input type="checkbox"/> 3. CAD
<input type="checkbox"/> K. Monitor	<input type="checkbox"/> U. Word Processor	<input type="checkbox"/> 4. CD-ROM
<input type="checkbox"/> L. Disk/Tape Back-up	<input type="checkbox"/> V. Database Manager	
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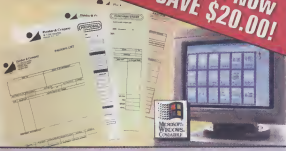
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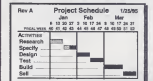
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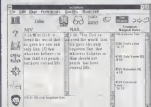
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Pretty trusting, aren't you? More like pretty stupid. But these scenarios are exactly like sending e-mail without digital encryption—something you probably do every day. Unencrypted e-mail can be intercepted by just about anyone on the Net: snoops, competitors, nosy coworkers, even hackers. But there's a free, legal, and as yet unbreakable solution called Pretty Good Privacy (PGP) to keep e-mail safe and secure.

The brainchild of programmer Philip Zimmermann, PGP incorporates Rivest-Shamir-Adleman (RSA) public/private key technology and the International Data Encryption Algo-



Keep It to Yourself: Anybody can read your Internet e-mail—that is, unless it's encrypted. PGP ensures privacy.

rithm (IDEA). PGP ensures that only the intended recipient can read your message, and it lets the recipient know that it was you who really sent it and that it arrived tamper-free.

Anyone can download the current freeware version, PGP 2.6.2, for noncommercial use (see "One-Minute Guide" below)—just don't try exporting it from the United States. Under federal law, encryption hardware and software are con-

sidered munitions subject to regulation. Instead, point your foreign contact toward PGP 2.6, which was developed outside the United States. Commercial users can purchase PGP 2.7 from ViaCrypt for \$125, and licensing for larger sites is available directly from RSA Data Security. Call (415) 595-8782 for details.

PGP 2.7 / ViaCrypt / (800) 536-2664 /
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ONE-MINUTE GUIDE

Armor Yourself: Pretty Quick Guide to PGP

Loose lips sink ships, so start protecting your e-mail privacy today. Start at the Massachusetts Institute of Technology's FTP server, the "official" source. A few tips:

WHERE DO I GO? MIT's server is at netdist.mit.edu. Log in as *anonymous* with your e-mail address as a password. Or try <http://web.mit.edu/network/pgp-form.html>.

PLEASE READ ME Study PGP's README file carefully. Other outstanding references:

PGP: Pretty Good Privacy, by Simon Garfinkel (O'Reilly & Associates, 1995); **Protect Your Privacy: The PGP User's Guide**, by William Stallings (Prentice Hall, 1995); and **E-Mail Security: How to Keep Your Electronic Messages Private**, by Bruce Schneier (John Wiley & Sons, 1995).

SPY VS. SPY Strict federal export laws require you to certify your U.S. citizenship, promise to abide by RSA Data Security license terms, and vow not to export PGP.

FOREIGN CORRESPONDENTS

Contacts outside U.S. borders can find copies of PGP 2.6 from many sites, including ftp.informatik.uni-hamburg.de.

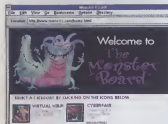
PRIVATE CLUBS

Interested in further discussion of electronic privacy issues? Try Berkeley's Cypherpunks (cypherpunkrequest@toad.com), the Electronic Privacy Information Center (info@epic.org), or the Electronic Frontier Foundation (info@eff.org).



Insites

NET ECONOMICS The University of Michigan houses a collection of comprehensive research on Internet economics—studies of access and pricing schemes, overviews of economic problems facing the Net, and more. <http://gopher.econ.lsa.umich.edu>



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INTERNATIONAL GALLERY Art treasures from Egypt, India, Japan, and more are available in a well-presented guided tour, including historical information and beautiful graphics. <http://sgwww.epfl.ch/BERGER/>

OFFBEAT ONLINE GUIDE Peachpit Press offers a complete hypertext copy of Gary Wolf and Michael Stein's *Aether Madness: An Offbeat Guide to the Online World*, a cyberdiary of a two-year I-Way journey. <http://www.aether.com/Aether/>

By RICH SCHWERIN, *I-Way* report to share? E-mail NetHead Rich Schwerin at rschwerin@pcc.ziff.com.

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NetHead Rich Schwerin: The best things online are free.

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Filename: medlin.zip Site: <http://oak.oakland.edu> Size/Time*: 1MB/26 Minutes

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Planning a trip to the Big Apple anytime soon? Look for free arts and culture info here.

Filename: bigapp.zip Site: gopher/techony.com Size/Time*: 1MB/26 Minutes

SGI Newsletter

Check out Silicon Surf, Silicon Graphics' online newsletter and free software.

Filename: newlet.zip Site: http://www.sgi.com/silicon_surf.html Size/Time*: 34K/1 Minute

Internet Tutorial

NetHead novice? Try Merit Network's Internet Cruise, a Net overview/tutorial.

Filename: cruise.zip Site: <http://nic.merit.edu> Size/Time*: 1.8MB/34 Minutes

Sound Utilities

Listen up for dozens of sound files, samples, MIDI and Sound Blaster utilities, and more.

Filename: sound.zip Site: <http://garbo.uwasa.fi> Size/Time*: 1MB/26 Minutes

Linux

Only for the truly brave: Bring Linux, a Unix-like OS, to your PC (pub/Linux).

Filename: linux.zip Site: <http://sunsite.unc.edu> Size/Time*: 2.4MB/43 Minutes

Convert It

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Filename: ucode.zip Site: <http://bongo.cc.utexas.edu> Size/Time*: 1.1MB/30 Minutes

Personal Finance Manager

No Quicken? Try one of several useful DOS-based financial apps (SimTel/msdos/finance/).

Filename: money.zip Site: <http://oak.oakland.edu> Size/Time*: 86K/2 Minutes

Periodic Table

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Filename: chem.zip Site: <http://garbo.uwasa.fi> Size/Time*: 90K/2 Minutes

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NetHead Ratings: *****Box seats, Camden Yards. ****Fifty-yard line, Candlestick Park. ***Ringside, Las Vegas. **Off-track video betting. *Pay-per-view Ping-Pong.

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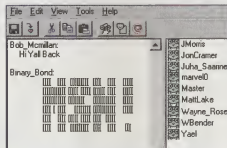
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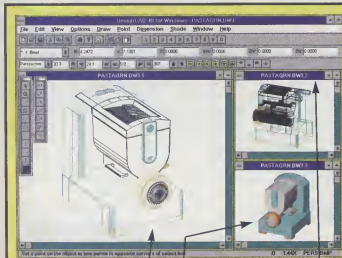
- 1 Set these modem and software parameters: 7 data bits, even parity, 1 stop bit, full duplex.
- 2 Call CompuServe's sales department at (800) 848-8199 from the United States and Canada. From other countries, dial CompuServe direct at (614) 457-8860. You can also call CompuServe with your modem. Set your modem as instructed above and dial (800) 348-3247. Press Enter when your modem connects. Type PHONES at the HOST NAME prompt, press Enter, and follow the onscreen prompts

to find a local access number.

- 3 Dial the access number with a modem. When it connects to the network, press Ctrl-C to get the system's attention.
- 4 At the HOST NAME prompt, type CIS and press Enter.
- 5 At the USER ID prompt, type 177000,5300 and press Enter.
- 6 At the PASSWORD prompt, type PC/CONTACT and press Enter.
- 7 At the ENTER AGREEMENT NUMBER prompt, type PC95 and press Enter.



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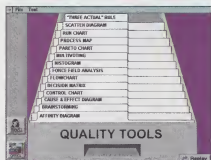
No wonder *PC Computing* gave the 4PleX a four star ranking and the title "King Quad." Today's CD-ROM explosion promises to take no prisoners. So arm yourself with a 4PleX and rest easy knowing you are equipped to win the battle. For your nearest Dealer and a free copy of our latest book "18 Questions to Ask Before

Purchasing a CD-ROM Drive" call
1-800-4PLEXTOR (1-800-475-3986).



MANAGEMENT 101

Everyone who doesn't want to be rich and successful, raise your hand. OK, you can close the magazine and turn on the TV. The rest of you hang around and learn about some CDs that will help you claw your way to the top—or remain king of the hill. Alternatively, flip the page and enjoy some more entertaining titles.



Total Quality: At \$60 per card-file entry, these tools better be good.



TOOLS OF TOTAL QUALITY ○○○○

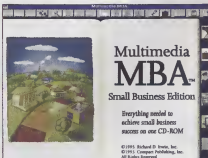
You want help... now. That's what you get with Tools of Total Quality, a course in practical, hands-on management techniques. Even mumbo-jumbo topics like Force Field Analysis turn out to be useful. By keeping the steps simple, this CD makes it possible to turn out expert pareto charts, decision matrices, or process maps in the five minutes you've got left before the next management meeting. But the information is so brief that at times I felt like I was missing some hidden button to access more information. That may have been because the price of the CD is \$890. For that much money, I expect someone to step out of the monitor and go to the management meeting for me.

Tools of Total Quality / MicroMentor / (800) 887-3917 / \$890 est. street price / Reader Service No. 686



MULTIMEDIA MBA SMALL BUSINESS EDITION ○○○○○

Oh sure, some CD-ROM title is going to train you up to the rarefied heights of MBA-dom. Where's the detailed text, the supporting illustrations and charts, the serious math and accounting tools, the real-world experiences? Well, they're all on this Windows CD-ROM. The collection of tutorials, multimedia, and tools—all linked through an excellent interface—is as close as you can get to earning an MBA without having to attend class. It's a lot of text beautifully supplemented by videos, animations, and examples of real advertisements that make their points quickly and effectively. The most impressive part of this title is its tools—worksheets linked to your own electronic spreadsheet; legal, advertising, and human-resource forms linked to



MBA OK: For the price of one book, here's a whole business course.



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Multimedia MBA Small Business Edition / Compact Publishing / (800) 227-5608, (404) 428-0008 / \$79.95 est. street price / Reader Service No. 687



YOUR PORTFOLIO INTERACTIVE ○○○○

There are two good reasons for you not to be investing in mutual funds: Either you're a retro-commie or you don't know the difference between a no-load and an expense ratio. If you fall into the latter category, then Your Portfolio Interactive is the CD-ROM to get. Based on a CNBC television series, the Windows title is a good introduction to mutual funds that even gets you started on an investment plan. It uses video and audio clips along with a text glossary to explain the basics of mutual funds and the types of funds best suited to conservative or aggressive investors. There's even a ten-question quiz to determine the level of risk you're comfortable taking. Although it includes information on more than 100 mutual funds, sorted by type and risk, some of it is more than a year old. For more current information, the disc comes with a separate program, Reuters Money Network, that lets you download current information about funds.

Your Portfolio Interactive is one program where multimedia is not always a good idea. Some audio clips rattle off numbers faster than I could follow them. If you're like me and have to ask people to repeat phone numbers three times, just check the fund listings in the daily paper.

Your Portfolio Interactive / CNBC and Compton's NewMedia / (800) 894-2622 or (800) 862-2206 / \$59.95 est. list price / Reader Service No. 688

○○○○○ Move over, Eisner. There's a new kid on the block. ○○○○ The key to the executive washroom. ○○○ An office with a view. ○○ A small cubicle. ○ A pink slip.



SCAN/US 00000

It's the nineties. Do you know where your customers are? You do with Scan/US. This Windows mapping and demographics disc is such a delight to use, it could even fit in a games roundup. The CD comes stocked with information from the 1990 U.S. census, with more recent data sets available at extra cost. Select whatever combination of information you want, from Hispanic population concentrations to median household incomes and cost of housing. It then appears on a map of the United States that zooms in to street level (and even pinpoints local malls). And while a lot of programs crawl on a 66MHz 486, this one redraws faster than you can take a sip of coffee. Expect to spend some time learning Scan/US, but also expect the time to be worth it.

Scan/US / Scan/US / (800) 272-2687, (310) 820-1581 / \$495 est. street price / Reader Service No. 659



BUSINESS HEAVEN 00

So maybe you don't have GM's software budget. You can still find decent programs for operating a small business in the world of public-domain software and shareware. For one-stop shopping, get Business Heaven for hundreds of programs for accounting, client management, inventory, database management, payroll, project management, statistics, presentations, invoicing, stocks and financial management, and... well, a whole lot more. The CD's Windows and DOS category menus and descriptions help you find the programs you need and also automate installation. The CD is cheap, but remember, the real cost comes from registering the shareware programs you use.

Business Heaven / Most Significant Bits / (800) 755-4619 / \$19 est. street price / Reader Service No. 690



FACTOMATIC BUSINESS LIBRARY 000

With no video, no animation, no audio, and no photos, Factomatic Business Library delivers the goods the old-fashioned way—in text. You can search hypertext volumes of nitty-gritty advice for negotiators, supervisors, executives, and sales managers. The best skills this disc teaches? Who to blame, and how to counter good-

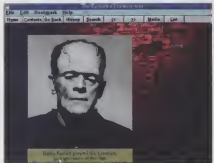
cop/bad-cop routines. Next time you're stymied in negotiations, take a rest room break and fire up this baby.

Factomatic Business Library / Compton's NewMedia / (800) 862-2206, (619) 929-2600 / \$30 est. street price / Reader Service No. 691



THE ESSENTIAL FRANKENSTEIN 000

When I was a kid, *Shock Theater* came on TV every Friday night. I was a sucker for it. My favorites were always the Frankenstein and Dracula movies. That's why, for old time's sake, I'm cutting The Essential Frankenstein: The Multimedia Experience a little slack. It's basically a Windows presentation of the text of two books—Mary Shelley's 1818 novel and Leonard Wolf's *The Essential*



It's Alive... Alive! Forget glass and plastics—this is *serious* recycling.

Frankenstein—along with a smattering of photos, trailers, and movie posters. There's even a shareware DOS game, *Monster Bash*. Most of the video is devoted to interviews with Wolf, which is not what I used to stay up late on Fridays to see. What we really need isn't the essential Frankenstein, but the complete monster.

The Essential Frankenstein: The Multimedia Experience / Byron Press Multimedia/21st Century Classics / (800) 482-3766, (818) 295-6600 / \$39.95 est. street price / Reader Service No. 692



ZEPHYR 0000

I didn't care for this DOS game very much at first, but that had less to do with the game than with the fact I have the hand/eye coordination of your average turtle. In *Zephyr* you operate one of six futuristic tanks battling it out on a series of planets for an interplanetary TV show.

There's some cute satire on real TV sports—commentary by Jimmy the Orion—but after a while you hit the Esc key to jump to the real action. Although the game is a race, it's next to impossible to figure out the course. Besides, you get more points for blowing away opponents. But what's most interesting about *Zephyr* is that multiple players can duke it out over a network. The computer opponents are hard to beat, but I have a better chance competing against mere mortals. See if you can slip this one pass your MIS people and try a lunch-hour battle with five coworkers.

Zephyr / New World Computing / (800) 323-8988, (818) 889-5600 / \$35 est. street price / Reader Service No. 693



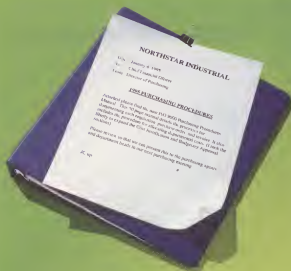
MICROSOFT DANGEROUS CREATURES 00000

Sure, Bambi's OK. And so is a cute little bunny or some harmless chipmunks. But in the world of animals, what attracts kids are the creatures that bite, sting, claw, and poison. Well, not just kids: Animals, particularly the ones that can kill us, fascinate adults, too. Microsoft Dangerous Creatures zeros in on this with Microsoft's hallmark attention to interface and detail. Its guided tours explore the Amazon, Africa, coral reefs, and other parts of the animal kingdom, but it's hard to stay on a tour for long because it's so tempting to branch out to other topics. You start by learning about male and female roles among animals and wind up finding out how an octopus poisons its prey. Now here's a CD-ROM title you feel you'll never fully exhaust.

Microsoft Dangerous Creatures / Microsoft Home / (800) 426-9400, (206) 862-8080 / \$59.95 est. street price / Reader Service No. 694

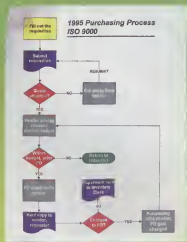


That's Mr. Lizard to You: Here are some animals not to cuddle.



(Sort through a fifty page plan to get to the point.)

or



(Get to the point with a single Visio diagram.)

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At CES, the Real Showstoppers

BY ROMEO SUNSLAP

This year the real action at the recent Consumer Electronics Show took place behind the scenes in high-security hotel suites where vendors privately unveiled their hush-hush prototypes to a select few. Here's an exclusive sneak peek at the products we'll all be using soon.



PC/PC:

Safeguard yourself from frivolous lawsuits, and prevent your kids from getting into politically incorrect trouble. KeyTronics' PC/PC software monitors keystrokes and screens out any potentially offensive words. And its Positively PC keyboard (shown above) disables any letter that could be used to type a hurtful word.

BEEP! BEEP! BEEP!

Shower Beeper:

Of course you want to be reachable 24 hours a day. But what happens when that critical call comes during the 10 minutes you're sudsing up each morning? Motorola's new clip-on, water-resistant pager is the no-tears solution. Available in handy male and female models.

Desktop At Work:

Alert! Alert! Short on staples? Nearly out of tape? Dispenser getting dangerously low on paper clips? You'll know instantly with Microsoft's first suite of At Work devices, each with its own MSN Internet address. Finally, what the Web was really meant for.



PHOTOGRAPHY BY MARK JOHANN

Were the Secret Products Glimpsed behind Closed Doors

NicoMouse: Finding it hard to get the tobacco monkey off your back, especially with stringent new workplace smoking restrictions? A new Nicorette-dispensing system from Swedish medical giant LooLirpa delivers a measured jolt of nicotine with each button press. Now say good-bye to the death-stick habit; just click and kick.



NanoDish: Protest button? No. State-of-the-art satellite receiver? Yes! Throw away that cable! With its powerful new DSP-2 chip, RCA has reduced dish size dramatically. Now you can receive

500 channels on this sporty lapel-mounted antenna. (Note: For best reception, sit or stand facing south.)



C-P-U C-U-P: Spilled coffee a problem? But still need that caffeine boost? Get the jolts; don't lose the volts. Prevent dangerous electrical shorts with Ronco's convenient side-mounted system cup holder. Attaches easily to the side of your CPU and safely supports up to two piping-hot mugs of java.



PetVR: Is Fido alone and sad all day waiting for you to return from work? Not any more. AlpoWorks PetVR lets your pampered pooch lope through endless 3-D fields of beckoning hydrants and pushover pussycats while you're gone. A dog-gone, (virtually) real relief for canine boredom.



WINDOWS 95 WIRED



The Official Story: According to the Microsoft Windows 95 Resource Kit, "You can use remote access to establish a local connection to transfer files quickly from a laptop to a desktop computer, or even set up a small, temporary two-computer network. . . . This capability is similar to that available with Interlink for MS-DOS 6.x,

which allowed users to transfer data through the serial port between two personal computers."

The Inside Story Beta testers have complained that the Resource Kit, which should be a detailed road map to Windows 95's innards, is long on hype and short on technical details. So what happened in the section covering the Direct Cable Connection (DCC) utility? Did someone forget to fire up the Marketing Wizard? It's one of Windows 95's killer features, and all it gets is a few brief paragraphs.

The lion's share of ink in the Resource Kit goes to Dial-Up Networking, the feature that formerly went by the name Remote Access Services. No matter what you call it, the payoff is the same: You run the dial-up utility on your desktop PC, which then waits patiently for the modem line to ring. Anyone—even Uma Thurman, if you're willing to share your phone number with her—can use the same utility to hook her PC and yours together. The host PC challenges the caller for a log-in name and password, then opens a pipeline to shared resources, including mail, files, and printers. It's a lifesaver if you're halfway across the country and desperately need a file on the office PC. But even at 14.4Kbps it's a slow connection you'll reserve for dire emergencies.

Here's a little secret: DCC uses the same network protocols as Dial-Up Networking and accomplishes the same results when you

connect two PCs via a parallel or serial cable. The difference is speed. Using an ordinary parallel cable, you can move data back and forth at eight times the rate of a standard high-speed modem. Reportedly, there are new cables that can connect two PCs over a parallel port at speeds that nearly match those of conventional network adapters.

Sounds like a souped-up version of Traveling Software's LapLink, right?

don't have a docking station or an expensive PC Card network interface.

Here's a sampling of what you can do:

- **Connect to a shared CD-ROM drive on the desktop.** Want to install the new version of Lotus SmartSuite or Microsoft Office on your notebook? You could swap all thirty-something floppy disks, or plug in a cable and do the whole job with three or four clicks.

- **Access a high-speed Internet connection on the desktop.** Then, with no network card or modem, transfer files directly to a remote PC. Of course, you could download them to the desktop, then move them across the wire. With DCC, though, you eliminate the intermediary and cut your file transfer time in half.

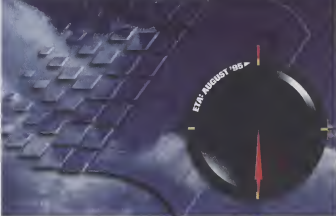
- **Print a batch of files to a hard-disk holding area.** Work offline while sitting in the back of a cramped Boeing 737, then painlessly send your files to a NetWare print queue back in the office. As long as the host PC is connected to a NetWare resource, like a printer or a file server, the guest has the same access rights.

Don't shed any tears for Traveling Software, though, because there's plenty of room for the next version of LapLink for Windows to coexist with DCC's high-speed parallel cable connections. Windows 95 doesn't have any built-in smarts for synchronizing

the data files on your desktop and notebook PCs, but LapLink does.

In the October 1994 Beta 2 release of Windows 95, there are still a few bugs in the DCC feature. They'll probably be ironed out by the time Windows 95 hits the streets, though. And if Microsoft is reading this, you can bet that the DCC utility will get its share of publicity in the Resource Kit, too.

Windows 95: The Countdown



Coming Soon? In mid-January, Microsoft's numbering scheme for new Windows 95 versions (*builds* in beta-speak) topped the 300 mark. Late August? It could happen. . . .

Wrong. The Resource Kit may dismiss the DCC connection as a "small, temporary two-computer network," but it's much more powerful than that. As long as two PCs are connected via DCC, the guest is a full client of the network, with all the rights and privileges of any other network citizen. The results can make it dramatically easier to use a notebook PC, especially if you

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